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# USSR Report

## SCIENCE AND TECHNOLOGY POLICY



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26 November 1984

**USSR REPORT  
SCIENCE AND TECHNOLOGY POLICY**

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## DEVELOPMENT OF IDEAS INTO PROCESSING METHODS

Moscow PRAVDA in Russian 26 Jun 84 p 2

[Article by F. Rudich, chief of the Science and Educational Institutions Department of the Central Committee of the Communist Party of the Ukraine (Kiev): "From the Idea to the Processing Method"]

[Text] Do we often ponder why precisely some materials and processing methods or others quickly become accessible to practice? Here is one example: in 1960 the first synthetic diamonds in the country were obtained under laboratory conditions at the Institute of High Pressure Physics of the USSR Academy of Sciences under the supervision of Academician L. Vereshchagin. In October 1961 the first 2,000 carats were produced at the Institute of Superhard Materials of the Ukrainian SSR Academy of Sciences. In a few years several plants--an entire sector for their production--were already in operation. Now diamonds of more than 20 different grades are being produced. The economic impact from their use in the national economy exceeds 1 billion rubles a year.

Although what has been said is quite well known, perhaps only specialists know that the priority works for Soviet science of physicist and professor O. Leypunskiy on the theory of the synthesis of diamonds played a decisive role in the advance. This illustrates the great importance of thorough basic research on the path to a new technological approach and efficiency in case of the use of the results of such research in the interests of practice. Therefore the processing methods, which have been developed on the basis of new scientific achievements, themselves also ask for production.

The analysis of the most important achievements of a number of institutes of the Ukrainian SSR Academy of Sciences, which resulted in noticeable changes in individual sectors and even the origination of entire subsectors of the national economy, convinces us of the correctness of this assumption. The electroslag process, which marked the beginning of specialized electrometallurgy, and the obtaining of powder materials and items made from them, for example, are well known. The algebra of algorithms and new methods of the solution of applied problems and the optimization of the control of calculations and data processing were developed at the Institute of Cybernetics under the supervision of Academician V. Glushkov. All this made it possible to develop the mathematical theory of the organization of macropipeline calculations. The technology of the designing, manufacture and

preparation for production of the components of multiprocessor computers also emerged. The new technology of calculations and the possibility of increasing their speed by the uniting of hundreds of processors are a kind of revolution in not only the use, but also the designing of computers.

The scientific search is revealing the need for purposeful basic research and its interpenetration with applied research. This means that basic work must be aimed without fail at the solution of specific important national economic problems. Precisely such an aspiration distinguishes the leading institutions of the Ukrainian SSR Academy of Sciences.

Diverse forms and methods of actively influencing the progress of research work and the strengthening of cooperation with production are characteristic of the Institute of Electric Welding imeni Ye. O. Paton, which this year celebrated its 50th anniversary. Here the party committee and the party organization as a whole are setting the tone. The monitoring of the fulfillment of the research plans, the education of scientific personnel, the development of socialist competition and the strengthening of cooperation with the party committees of production enterprises are at the center of their attention.

Many institutes have a good scientific reserve for the development of new processing methods. However, it is a long distance from it to embodiment at an enterprise. Far from all scientists have the skill of the materialization of new processing methods. A certain psychological prejudice also tells: it is considered to be of greater prestige to solve scientific problems than to prepare technological rules. But without them you will not assimilate new processes. In order to step up the work of scientists in this direction, the collective of the Institute imeni Ye. O. Paton at the beginning of the current five-year plan proposed to launch socialist competition under the motto: "The alliance of creative thought and creative labor for the successful development and introduction of new equipment and technology." This initiative was approved by the Central Committee of the Communist Party of the Ukraine and was taken up by the scientific collectives of the republic.

Let us take as an example the Institute of Molecular Biology and Genetics of the Ukrainian SSR Academy of Sciences. On the initiative of the party buro and with the support of the board of directors they revised here the themes of research. As a result the general direction of research was specified more clearly, unpromising operations were curtailed. On the basis of the reorganization of the scientific subdivisions seven institute-wide laboratories, which ensure the making of new chemical substances and their laboratory testing for all the departments, were set up. The three institute programs on urgent problems of genetic engineering dictated a comprehensive approach to their solution.

And here are the results: a genetic engineering process of the supersynthesis of several biologically active substances was developed, effective technologies of the cultivation of agricultural crops were devised, remedies for various purposes were obtained. Among the latter, for example, is a medical form of a wide-spectrum antiviral compound--isatizon. Its checking at two poultry farms showed its great effectiveness, now extensive production

tests are ahead. The total economic impact from the introduction of the results of the developments increased during this time by nearly eightfold, the number of contracts on creative cooperation increased by twofold. The technological "list" did not confirm the fears that the scientific results would worsen: the most interesting operations, which are connected with the transfer of genetic information in the cells of plants, were performed at the institute for the first time in the world.

Important steps, which are bringing basic science closer to the demands of practice, have been taken, however, much still has to be done. First of all the pilot experimental base of the academy has to be strengthened. Of course, now it is being developed much more rapidly, in the past 7 years alone the amount of work performed by the corresponding subdivisions has increased by more than twofold. However, this still does not meet the requirements of the realization of the available scientific reserve. At many academic institutes highly efficient developments, including energy- and resource-saving technologies, have been waiting for years for experimental and pilot checking and are becoming obsolete, while production is being deprived of the opportunity to use them in good time.

The Presidium of the Ukrainian SSR Academy of Sciences is actively seeking means of speeding up the implementation of scientific and technical achievements. One of them is joint work with ministries on comprehensive plans of scientific research and the introduction of its results. Joint meetings of the presidium of the academy with the collegiums of the ministries of the communications equipment industry, the gas industry, the construction of petroleum and gas industry enterprises and others are being held. This is creating a realistic basis for the broadening of cooperation with sectors. The academy is now maintaining such contacts with more than 20 union and republic ministries. Republic regional and sectorial programs have become a good means of stepping up the development, assimilation and dissemination of advanced processing methods.

I will cite the development and introduction of the technology of obtaining a liquid substitute of whole milk for the feeding of calves. During its development the Institute of Technical Thermal Physics of the Ukrainian SSR Academy of Sciences was faced with a number of difficult problems. All the stages of the embodiment of the idea in practice were taken under control by the Dnepropetrovsk Oblast Party Committee. The questions of the material and technical support of the experiment, the cooperation of the organizations participating in it and the training of personnel were settled with the participation of the secretaries of the party committees. It was established that the use of the liquid substitute makes it possible to decrease the consumption of whole milk and to increase the marketability of dairy farms. Thus, in 10 months of 1983 the workers of agriculture of the oblast sold to the state an additional 23,000 tons of milk.

This is one of the processing methods, which was proposed by the Ukrainian SSR Academy of Sciences for inclusion in the national economic plan for the 11th Five-Year Plan. The USSR State Planning Committee has outlined measures on the significant increase of the production of the whole milk substitute in the country. In all more than 300 new processing methods, which were developed at

institutes of the Ukrainian SSR Academy of Sciences, are being used at enterprises of machine building and ferrous metallurgy, the chemical, food, gas and other sectors of industry, in agriculture and construction.

And still the fruits of development are implemented very slowly at times. Especially great difficulties arise if an innovation must be assimilated in one sector, while another will use the product obtained by means of it. Thus, back during the 9th Five-Year Plan the Institute of Chemistry of High Molecular Compounds of the Ukrainian SSR Academy of Sciences developed very valuable adhesive compounds like Sprut and Styk. They make it possible, for example, to repair petroleum and gas pipelines under water and to patch holes in ships without placing them in dock. The institute has been flooded with delivery orders, but industrial assimilation of the innovation is being dragged out.

The question of the industrial production of a continuous excavator and loader for rock, which were developed by scientists of the Institute of Geotechnical Mechanics of the Ukrainian SSR Academy of Sciences, has not been settled for a long time. The introduction of a number of other highly efficient processing methods was dragged out for years. Apparently, the appropriate ministries and planning departments must display greater concern for the implementation of innovations.

The decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" is affording additional opportunities for the increase of party influence on the development of fundamentally new processing methods and the extensive realization of the reserve developed by science. Organizationally it is also necessary here to develop further the method of goal program planning, which makes it possible to set up interdepartmental cooperation. It is also important to increase the role of party committees in the acceleration of scientific and technical progress. The time has come also to generalize the experience of such work in various regions of the country.

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CSO: 1814/175

## ADVANCEMENT OF YOUNG SCIENTISTS AT EDUCATIONAL INSTITUTIONS

Moscow IZVESTIYA in Russian 21 Jun 84 p 3

[Interview with USSR State Prize winner and Vice President of the Estonian SSR Academy of Sciences Il'mar Paulovich Epik, by IZVESTIYA correspondent G. Gusakov (Tallinn): "On Degrees and Early Flight"]

[Text] At the Estonian Academy they told me with a smile the following recent incident from the life of Vice President of the Estonian SSR Academy of Sciences and USSR State Prize winner Il'mar Epik. In July of last year he needed at all costs to go sailing on the ship of the Estonian Academy of Sciences, the "Ayu-Dag." He believed that he simply could not but take part in this scientific expedition--what kind of chairman of the republic council on problems of the Baltic Sea is he then? However, he appeared before the medical commission on crutches, and, of course, the physicians began to protest:

"Where are you going?"

"On a voyage, and without fail," the 66-year-old candidate seaman said confidently.

"But...."

"But have you seen a pirate? What does he, a sailor of extra long-range navigation, usually look like? In his teeth is a pipe, in his hand is a tankard of rum, his eye is bandaged with a black band, while instead of a leg there is a wooden leg without fail. I do not smoke, do not drink, my eyes are normal, while the crutches, if you greatly dislike them, I can replace with a cane."

The figurative comparisons would have in no way influenced the decision of the commission. But Epik set out the references of respected medical institutions. In the end they permitted him to go to sea.

The main concern of Epik is heat and power engineering. I came to an agreement with him on a meeting. I search for him and suddenly find out: in the morning he got in the car and prevailed upon his old friends, A. Neyman, an adviser of the Estonian SSR State Planning Committee, and V. Kikas, a professor of the polytechnical institute, and they drove 100 km to the Punane

kunda Plant. The situation with the production of Portland cement, which had formed there, is disturbing. Then to the Pribaltiyskaya and Estonskaya GRES's--not everything is well with the renovation. As a result, there are detailed business reports to the republic Council of Ministers, the USSR Ministry of Power and Electrification and the Academy of Sciences of the country.

But I should not give up my goal--it is necessary to continue the discussion which was begun in the newspaper by President of the Ukrainian SSR Academy of Sciences B. Ye. Paton (IZVESTIYA, No 1, 1984) on the young generation in science. Academician Epik returned late from the trip, and we met in the morning. Il'mar Epik began the conversation:

[Answer] "Science urgently needs young people. For the present the shortage has not become obvious. But Academician Paton is correct: this well-being is apparent and temporary. It is necessary to change the system of the training of personnel for scientific institutions. It is featureless. You submit a request to the State Planning Committee in advance, 3 years ahead, and indicate the number of the specialty and the quantity. And young people with diplomas from an institute, but who at times are completely indifferent to scientific activity, arrive. How much time is spent in vain, until this is discovered. The solution?

"Only a real scientist can recognize in a student his future. The right to pick students for work in science should be granted precisely to scientists. And here the link of academic science with the higher educational institution--the base chairs at the institutes of the Academy of Sciences--is really effective. An example which has justified itself well--the system of the Physical Technical Institute in Moscow--is well known. The base Chair of Solid-State Physics of Tartu State University has been operating nearly 10 years now at our Institute of Physics. The chief and instructors through the combination of jobs deliver lectures, conduct special courses, hold practical lessons at the laboratories of the institute and supervise scientific research work within the framework of course and graduation projects. In the three senior years the students spend a significant portion of the time within the walls of the Institute of Physics, taking part in experiments and contractual jobs. But this experience for the present has not received proper dissemination, rather, it is an exception to the general rules."

[Question] "A young person has come to science, and is his first concern, along with scientific supervisors, to settle down?"

[Answer] "Yes, because his material and moral situation, rights and duties directly depend on this. But the increasing formality of this great act is troubling me more and more. Now it is permitted to defend oneself in accordance with the abstracts of published works, but in most instances in practice the old means is the dissertation. But look at what the size is. In candidate dissertations there are not less than 200 pages, while in doctoral dissertations there are always 500. This is a gigantic work of 4-5 years. Thus, the most fruitful stage of life has been spent on the development of the beds, which have been raised by someone, while it never reached the new, most

important thing. External attributes--substantiality, thoroughness--have become, unfortunately, the basic criteria of the value of a dissertation.

"But meanwhile the criteria of scientific competence are also more reliable: authorship certificates for inventions, patents and licenses and, finally, the index of scientific quotation always make it possible to judge quite objectively the "capital" of a young scientist, his real scientific competence. But all this, so to speak, is a favorable background in the evaluation of the real efficiency of a person in science, but should be, in my firm conviction, basic and decisive."

[Question] "I have heard much about the difficulties of scientific development: it is necessary to promote a capable and diligent young scientist in good time. But there are only two levels--junior and senior scientific associate."

[Answer] "And the wage in science is such that a candidate of sciences and a junior scientific associate receive 20-30 rubles less than the average wage of workers. Here at the Estonian SSR Academy of Sciences there is not even a dormitory for graduate students. The majority of beginning scientists live with particular difficulty during the decisive years of their scientific development and contribution to science. A graduate student or beginning scientist rarely receives a separate apartment. Real opportunities are afforded when there are already 2-3 children in the family and the candidate dissertation has been defended. And not by chance, therefore, do we pick for work in science primarily residents of Tallinn and Tartu and immediately reject young people who have a permanent resident permit in other cities and rayons of Estonia."

"It does not raise doubts for anyone that in the era of the scientific and technical revolution science has become a productive force. The entire national economy directly depends on the rate of its development and the introduction of achievements in practice. Planners, financiers and managers have been repeatedly convinced that the most effective investment of assets is investment in science. While the December (1983) CPSU Central Committee Plenum, at which it was directly emphasized: 'The organization of the entire set of scientific and technical operations for the present is far from adjusted,' testifies with all certainty that they are inadequate and are being distributed not with the proper effectiveness and the rate of development of scientific thought for the present does not satisfy us."

[Question] "The desire of young people to see the results of their labor and to sense already today the importance and usefulness of their work is always very keen. What is the contribution of young scientists to the matter of introduction?"

[Answer] "This is a most painful issue. Let us see who is really interested in the introduction of an innovation. The plant never is, it has a firm plan, the longer it stamps its own items, the better and more tranquilly it lives. The same goes for the institute. Let us take a different route. In mathematics it is called a proof by contradiction. Let us assume that a processing method, which was developed by a scientific collective, turned out

to be inefficient. Who bears the responsibility? The institute? No. The author-developer? No. But what if the processing method turned out to be most efficient and provided the national economy an enormous impact? What do the institute and a specific scientist get from this? In most instances only moral encouragement. Once the obtained degree already determined the material possibilities in case of the minimum fulfillment of official duties, and no forces were able to shake them. But what will induce the maximum fulfillment? Only enthusiasm and dedication to science and one's job. For the present there is no economic mechanism which regulates the interrelationship of science with production. And until it begins to operate, it is difficult to speak of cardinal changes in the rate of development of scientific and technical progress in the national economy."

[Question] "In drama and the cinema the figure of the young unlucky scientist is now popular: they do not accept his ideas, he comes up against everyone, in the end they turn him out of the institute and laboratory, his sweetheart leaves him. Is that the way it is in life?"

[Answer] "I have a quite specific recent example. We had a good student, at the all-union competitions he took prizes, after graduating from Tartu University he came as a junior scientific associate to the Institute of Astrophysics and with time would have been quite capable of becoming an important scientist. But life turned out differently. He preferred to move to a neighboring kolkhoz, became an electrician and received a nice apartment. His salary is twice as great as it would have been at the institute.

"Why did it happen this way? Where is the cause? In the disillusionment with science? Hardly. Most likely it is in the obvious lack of prospects. People of my generation became candidates, doctors, laboratory chiefs and directors of institutes at the age of 25-30. And with youthful energy they rushed into the assault on unexplored peaks. Today the average age of the directors of our institutes is 55-60. P. Saari alone, the director of the Institute of Physics, is 39. Formally you would not express dissatisfaction with anyone. All are highly experienced, they do not have mistakes, everything is going smoothly and steadily, while the fact that there are no famous achievements--they do not reproach for this.

"And when a young person, who is full of strength and energy, with all the inherent qualities of a real scientist arrives, one day he suddenly understands: a decade and a half will pass before he will receive the opportunity to engage independently in real work. Whom will such a prospect suit? For this reason he goes to the kolkhoz as an electrician: not everyone will wait for his ship to come in."

[Question] "So what do you suggest?"

[Answer] "To determine the number of scientists not by rates and positions. There should be as many rates and positions as there are real scientists. The expenditures on the scale of the national economy will pay for themselves in the shortest time, while the climate at our scientific institutions will

become favorable and the approach will become businesslike. And if a mechanism of the accounting of the real contribution to science is put into effect, then, pardon me, the problem of its rejuvenation will also not exist."

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## ROLE OF INDIVIDUAL INVENTORS DISCUSSED

Moscow IZVESTIYA in Russian 6 Jun 84 p 3

[Article by USSR State Prize winner and Honored Inventor of the RSFSR V. Ovchinnikov: "Who Will Catch the 'Firebird'?" ]

[Text] In recent years the question of the need for the development of fundamentally new machines, technological processes and materials and the substantial increase of the technical level of production has become more and more urgent. This is discussed, in particular, in the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy."

An important reserve in the solution of this problem is the development of inventions. Success here depends both on the promptitude of ministries and departments and on the activeness of the USSR State Committee for Inventions and Discoveries.

It would seem that everything in this matter is all right. In the past decade more than 650,000 inventions have been registered, which comes to 63 percent of the innovations which have been marked with authorship certificates during all the years of Soviet power. At the same time the qualitative aspect of creative invention work cannot but arouse anxiety. The overwhelming majority of authorship certificates are issued for insignificant technical decisions, therefore the effectiveness of the development of inventions in our country is increasing extremely slowly.

The scope of the development of inventions is achieved primarily in the process of the fulfillment of planned work. Collective creativity is typical of the "official" development of inventions, and it is yielding definite fruits. But (the executives of the State Committee for Inventions and Discoveries cannot but agree with this) in this case the efforts of the developers of new equipment are aimed, as a rule, at the improvement of already existing machines, devices and technological processes. Revolutionary inventions, which raise technology to a fundamentally new level, with the years are becoming rarer and rarer.

But there is a reserve which for the present is still being used far from adequately. It is a question of inventors who work individually. The search for fundamentally new decisions, which ensure the achievement of a

qualitatively new level of equipment and technology, is characteristic of their creative work. The invention of engineer I. Ivantsov, which is opening new means in metalworking, the miniature press designed by P. Radchenko, which develops a pressure of 25 tons, and many other truly revolutionary innovations can serve as examples of such creative work. Single inventors are a mass phenomenon, a great many of them are dispersed throughout our country, and they create practically free of charge.

Having talent and a thorough understanding of equipment, these people experience an insatiable need for creative work. A special frame of mind, when "the firebird is being hunted" and the conceptual key of a cardinally new solution is outlined, forms here. It is possible to cite many examples of how in case of the relieving of an inventor and the transition to the conditions of a free search a sharp increase in his creative output occurs. The already mentioned engineer I. Ivantsov on account of the watch system of work began to work as a grinder in repair workshops, in order to use the month interval between watches for the development of inventions.

The author of these lines devoted his entire life to creative technical work. But only after retiring on a pension did he obtain the opportunity to utilize fully the gained experience, knowledge and intuition for the development of cardinally new equipment--and not only for the sector in which he recently worked. Not for the sake of royalties, but because of the aspiration to fully realize his creative reserve and to make the maximum contribution to the acceleration of scientific and technical progress. There are many such people in our country. And the State Committee for Inventions and Discoveries believes entirely incorrectly that the time of single inventors has passed. Individual creative technical work deserves as serious attention as collective creative work.

People may reply to me: the applications for innovations, which have been developed in the process of individual creative work, are examined in the committee, authorship certificates are issued in accordance with them. But are many of them embodied in real designs and do they go into series production? Inventor M. Login with the machine tool, which was built by him from means at hand, travels like a craftsman working on his own about enterprises in order to cut the necessary number of metal washers. The same I. Ivantsov, who solved an important engineering problem, ran into difficulties when the need arose to check the innovation experimentally. Scientific institutions are in no hurry to promote the introduction of inventions which have been made "on the side."

It seems that the State Committee for Inventions and Discoveries should place on the agenda the question of the identification of talented inventors who work on their own and the creation for them of the conditions for successful creative work and for the quick implementation of its results. The settlement of this question, undoubtedly, will help to raise inventing to a qualitatively new level.

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CSO: 1814/174

## ACADEMICIAN GLEBOV ON SCIENTIFIC DEVELOPMENT

Moscow IZVESTIYA in Russian 30 May 84 p 3

[Interview with Hero of Socialist Labor Academician Igor' Alekseyevich Glebov, director of the All-Union Scientific Research Institute of Electrical Machine Building, Chairman of the Leningrad Scientific Center and the Interdepartmental Coordinating Council of the USSR Academy of Sciences and the Permanent Commission for Science and Technology of the Council of the Union of the USSR Supreme Soviet, by IZVESTIYA special correspondents Ye. Manucharova and V. Nevel'skiy: "I Take Upon Myself..."]

[Text] They called him a dreamer, a fanaticizer: What is he up to now? They were surprised. In the country there is the postwar dislocation, it is necessary to restore a bit more quickly what lies in ruins. But what about him?

But he knew: the strategy of today's scientific research and the correctness of the decision, which you are now making, depend on how clearly you make out tomorrow. In the war, in the clash of technology, characters and philosophies, he understood once and for all: for victory it is necessary to lead the world level of science and industry.

He was already 32. No, he was only 32: it is still possible to find time for much. And he tackled an entirely new area--the development of the theory of large electrical machines. His dissertation, which was completed before the war itself, did not deal with this. On the day, which had been set for its defense, he was far from his native Leningrad--near Maloyaroslavets: his battery was firing there on the fascists. Having returned from the front, he found only a few partly burnt pages--that was all that remained of his scientific work. During the blockade someone had thrown it into a small stove.

With his phenomenal memory (he is capable of memorizing in a day up to 500 words of a foreign language, as he did during the war) it would have been no trouble for him to reconstruct the lost computations. And given his capacity for work (for years he has given only 5 hours a day for sleep) very little time would have been needed to prepare himself on the old theme and to "settle down." But this was not the goal of Igor' Alekseyevich Glebov.

His criteria are different. Both then, and now. What does he value in young scientists? In his students? He responded immediately to our question: "The results of work. It happens that a person promised everything, but was not able to do it. While another person did what he promised. It is even better when he does it without unnecessary words."

Hero of Socialist Labor Academician I. A. Glebov is the director of the All-Union Scientific Research Institute of Electrical Machine Building. He is an organizer of science and a researcher. New ideas, developments, experiments and machines, which are necessary for the development of power engineering, are connected with his name.

He studied the most serious problem of high-speed ion systems of excitation for the hydraulic generators of the Volga hydroelectric power stations. And he successfully solved it. The practical application in electrical machine building of the phenomenon of superconductivity, which occurs in metals at extra low temperatures, interested him. As a result the first cryogenic turbogenerator in the world was developed.

How do successes of this kind come about? After what events does a routine encounter with the unknown (and this is what science is) end with the development of equipment which leads the world level? Here is just one incident which they recall at his institute. An experiment was under way. They were feeding liquid helium into the rotor cryostat in order to attain the extra low temperature, at which the effect of superconductivity should have appeared in the winding of the generator. Two days has passed, but it had still not appeared. Should they go on pumping helium? It is risky. Should they stop? But only a few degrees remained to the goal.

Igor' Alekseyevich sat down at the calculations. Having completed them, he raised his head: "Continue." How many times, without flinching, he had assumed the responsibility.

The frozen indicators of the gauges came back to life only after 40 minutes, when it seemed to everyone that it was a failure. To everyone, except Glebov. He was sure of his calculations. And of those who had performed the difficult work together with him. He was not slow to thankfully congratulate them: "You are the first. Thank you!"

We ask Academician Glebov:

[Question] "What do you consider the main thing in a manager?"

[Answer] "Conscientiousness. A responsible attitude toward one's own work and benevolence toward those with whom you work. Then difficulties do not arise. And another thing: the aptitude for teaching. The ardent desire to find out what others have been able to do at the same time as you. And what no one has yet been able to do."

[Question] "What directions of today's activity of your institute are most promising?"

[Answer] "For example, the ones which are connected with thermonuclear research. We are taking part in the work on the development of two new experimental Tokamaks.

"The research in the area of cryogenic engineering is extremely interesting. The application of the effect of superconductivity in power machines. The efficiency of the cryogenerator comes to 99.4 percent--an unprecedented value in world practice, while the unit capacity of the machine can be increased to 10 million kW. I am convinced: the future in power engineering lies in cryogenic engineering."

[Question] "What do the words 'the courage of a scientist' mean for you?"

[Answer] "In science it is impossible without determination and certainty. Without them it is difficult to generate cardinally new ideas, it is impossible in defiance of the opinion of others to fight for what you believe to be right."

[Question] "Consequently, does the scientist need the right to take risks?"

[Answer] "Of course. If a problem, which concerns, for example, equipment of the third millennium, is being worked on, it is necessary to realize that far from everything will turn out ideally. Of course, we are trying to work so that there would be no expenditures in vain. But a negative result is also necessary for science. When it becomes clear that the chosen means is incorrect, it is necessary to find in oneself the strength to start everything over again. And to calmly seek a solution in a different direction."

[Question] "This is only how they put it: 'calmly.' In reality: there is stress here. And what kind...."

[Answer] "Right you are. There is also a quite controllable process--keeping cool under stress. In war without this it was also possible to lose one's head. In the most direct sense. And now it is necessary to be able to relieve stress by joking. Especially in a press for time. Such are the lessons of life."

It was harsh and dangerous--the life which taught Glebov ways out of stress and the press for time. At the front he headed army artillery reconnaissance. The batteries shot in accordance with his calculations. It was believed: it is impossible to do them more rapidly than in 2.5 minutes. But Glebov practiced from morning to night and achieved his objective. While from the observation post he dictated to the signalers the beginning of the phrase ("...over the dugout shelters a disruptive fuze..."), at the same time his mind had time to make the calculation. And Glebov without a pause then designated the initial data. It turned out that "zero time" was being spent on the calculation.

[Question] "How is the hierarchy of goals and tasks being constructed for you today? What in the organization of science is in first place?"

[Answer] "Automation. Both in the organization of scientific research and in industry. Without it the development of flexible production systems is impossible."

[Question] "You head the Leningrad Scientific Center of the Academy of Sciences and the Interdepartmental Coordinating Council. Which of the innovations, which have been proposed by specialists in recent times, have you had to stand up for, defend?"

[Answer] "The ideas connected with the problems of powder metallurgy, with the new methods of coatings, which were developed by the Leningrad shipbuilders. The staff members of the Physical Technical Institute imeni Ioffe and the Institute of High Molecular Compounds have developed an excellent polymeric material, but they are not able to introduce it. It turns out that the Plastpolimer Association should set to work on the assimilation of the innovation, but it does not have the necessary equipment. It could produce it. In short, in order to solve problems like this, it is necessary to go through the entire chain, unraveling the tangles of organizational problems and uniting the broken links. The problems of ecology are even more complicated."

Another digression. On the initiative of Glebov the Interdepartmental Coordinating Council held a conference in Petrozavodsk. The problems of the efficient use and reproduction of the forests of Karelia were discussed. New technologies of the processing of wood are needed. At present its scraps come to 40 percent. The situation is obviously intolerable. The idea of the conference was that the vertical line of management (the sector) and the horizontal line (the region) would specify a common goal and together would head for it. The mighty strength of science was given in aid to experienced workers.

Glebov as the chairman of the Leningrad Scientific Center and the Interdepartmental Council of the USSR Academy of Sciences is striving to combine the forces of previously disconnected scientific collectives. This is very important for the development and accomplishment of comprehensive goal programs. Several such programs are aimed at the preservation of the health of nature, first of all the forests and waters of the north. It has been revealed that Lake Ladoga is being fouled.

"This cannot but arouse alarm," Igor' Alekseyevich says to us. "Blue-green algae are taking over Ladoga. Protection is needed. Whereas they have been concerned about Baykal, previously they did not study properly the problems of Ladoga, which is of such enormous importance for the entire northwest. For your information: about 30 years would be needed to change the water in this lake if only once. If the decision were made to clean the lake and to rinse it thoroughly, an entire century would be spent on this. The necessary organizations have already joined in the work connected with the protection of the lake. We hope that with time the entire set of protective measures will be specified in the appropriate decision."

[Question] "You are the chairman of the Permanent Commission for Science and Technology of the Council of the Union of the USSR Supreme Soviet. What sort of questions does it consider?"

[Answer] "Each year we carry out such an important measure as the preparation of the plan and budget for science and technology. This is difficult. It is necessary to gather and generalize much material in order to understand: What was it possible to do in the country during the past year, and if something was not done, why and who is to blame for this? The same thing also goes for the budget: How was the money, which was allotted for science, spent?

"The second important direction of the work is the discussion of urgent problems of science and technology. Of course, you will not cover everything, we select only the most important ones. For example, last year, on the basis of the decisions of the 26th party congress and the CPSU Central Committee plenums, we discussed the work of the leading sectors on the saving of energy.

"Before this question was submitted for discussion, an ad hoc preparatory commission studied it first. It worked in close contact with the State Planning Committee and the USSR State Committee for Science and Technology--it gathered information on the state of affairs in the country, analyzed it and prepared an objective report. Then this report was examined at our meeting jointly with the representatives of many ministries.

"We strive to give clear evaluations. We do not embellish and round off anything. In each case the discussion ends with specific conclusions: to what are the oversights due, what is it necessary to do in order to correct the matter. Two or three permanent commissions examine some questions jointly. And then up to 200 deputies take part in their work."

[Question] "What helps you manage to do so much?"

[Answer] "The planning of each day. I draw up a schedule early in the morning. Then I live according to it without internal haste."

[Question] "There are fates of ideas, inventions. But are there also personal fates, the way of life of people? They do not come to you as a deputy with simple questions."

[Answer] "Now right here one does not have to take time into account. The first Friday of every month is reception day. You are correct: the questions, with which people come, are not easy. Before helping, it is necessary each time to do some hard work, to find out a bit more about a person, to find convincing arguments for a talk with the chairman of the executive committee of the rayon soviet, with the workers of the city soviet executive committee."

Now it is Friday, 3:00, the Executive Committee of the Smolinskiy Rayon Soviet. The woman talking with Glebov obviously does not want the deputy to think that she is trying to move him to pity.

"No, no, I am not a survivor of the blockade. At that time I was not in Leningrad."

"Where were you working?" Glebov asks.

"At a hospital. Here are the references. Not all, of course. I was young. It seemed that it was more important to affix one's signature at the Reichstag than to preserve the document."

"At the Reichstag? Hence, you were fighting. Why is this document not in your file?"

"Here it is. I did not storm the Reichstag. I was a hospital attendant. But I did register, we all went there--victory!"

The equable benevolence of the man talking to her gradually calms the woman. And the matter becomes clearer. She is pleased by the conversation, but, evidently, does not immediately understand that the question in essence has already been decided by the deputy.

In essence has been decided. But how many troubles still face Glebov, before he will close the case and will help in the request. The old rayons of Leningrad. The difficult rayons. And Glebov writes letters, demonstrating again and again the legitimacy of the requests of his voters.

At first (very frequently) they turn him down. But the deputy is persistent, he will not give up and will see everything, which he has taken upon himself, to the end. We saw in the folders cases which had been dragged out for 3 years.

The building of personal fates is a difficult matter. But thoughtfulness is a fundamental trait of Glebov's character. And therefore, no matter how complex the external circumstances may be, again and again he takes the decision upon himself. As he did during the war. As he acted when the experiments with new machines were under way. That is how he was made: the difficult he takes upon himself!

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## TEMPORARY SCIENTIFIC-PRODUCTION SUBDIVISIONS

Moscow SOTSIALISTICHESKIY TRUD in Russian No 6, Jun 84 pp 101-105

[Article by S. Belen'kiy and P. Chervonoborodov, candidates of technical sciences, State Scientific Research Institute of Motor Vehicle Transport]

[Text] Our country possesses enormous intellectual potential for accelerating scientific and technical progress. This is an entire army of qualified scientific workers and specialists. The pace of materialization of new knowledge, the return from resources expended for the training of scientific workers and the conducting of research depend upon how closely science is tied to production. For this reason it is difficult to overestimate the importance of searching for new economic mechanisms capable of joining the interests of scientists and practical workers. Articles discussing this problem were published in the periodical SOTSIALISTICHESKIY TRUD (No 10, 1982, p 96; 1983, No 3, p 75, No 7, p 96, and No 8, p 78). It appears useful to us to continue the discussion begun. This is also directed by the decree of the CPSU Central Committee and the USSR Council of Ministers "On measures to accelerate scientific and technical progress in the national economy."

The forms of interaction of fundamental and applied science with production are quite diverse. In particular, the academic institutes organize branches which refine scientific developments into prototypes of machines and production processes, and train personnel capable of introducing them into practice. The academy institutes and the plant organize laboratories staffed with personnel from both organizations, supplying them with material and technical resources on an equal basis. Contractual agreements for cooperation between scientific and production organizations have also become widely practiced.

Scientific-production associations are called upon to play an important role. The decree on measures to accelerate scientific and technical progress recognizes the desirability to expand the practice of organizing temporary scientific-production subdivisions within associations and at enterprises, which would be called upon to solve major problems in the national economy as well as to attain scientific and technical objectives of an inter-sectorial nature.

At the same time, the intensity of the "idea--development--experiment-prototype and wide introduction" process is so far not resulting in the necessary pace of scientific and technical progress. Whether this concerns inventions or

organization of technology innovations, the production workers often are in no hurry to give them the green light. In our view, the causes lie in deficiencies in the economic mechanism.

In accordance with directives of the 26th CPSU Congress, measures are presently being taken to eliminate them. It is planned to reduce the number of valuation indicators, expand the use of a unified fund of resources for the development of science and technology and of credit for financing measures of scientific and technical progress, to create appropriate reserves for these same objectives, and increase incentives for the development and introduction of the newest types of equipment. All this will undoubtedly open up new opportunities for improving the economic mechanism for accelerating NTP [scientific and technical progress].

Using examples from the area of motor vehicle transport, which is close to us, we will attempt to show how the proper conditions could be created where, let us say, motor vehicle transport organizations of the country would begin to readily assimilate scientific developments, in particular those accomplished by the Scientific Research Institute of Motor Vehicle Transport (NIIAT). The mechanism of interrelations between science and production must induce all participants, and first of all the production workers, to take an active part in the process "idea--development--introduction." In this lies the guarantee for accelerating scientific and technical progress.

The results attained by NIIAT research are forecasts, programs, principles, standard production processes, comprehensive design projects, general outlines, organizational structures, tariffs, norms for resource consumption, equipment operation requirements for rolling stock, standards, regulations, methods and other documents regulating technical policy and operational processes on the sector and inter-sector level. These constitute one of the important prerequisites for significant effectiveness of such scientific and technical work.

Let us take comprehensive technical projects for centralization of motor vehicle transport on intercity highways. Today 60-65 percent of this is performed by departmental motor transport vehicles. Their empty runs constitute about 40 percent, and the loss from underutilization of available transport capability in comparison with common motor vehicle carrier use is 530 million rubles. The content of the projects is to shift all transport operations to the latter form by organizing specialized motor vehicle transport enterprises, placing in order the operations of dispatcher-control stations, improving the working conditions of drivers, mechanizing the monitoring and control of motor vehicle traffic and to expand the range of services offered to clients.

The per-shift and bonus system of wage payment to drivers is another important development of the institute. Its essence lies in abandonment of payment for work indicators which in fact do not depend on the driver. For example, idle time during loading and unloading operations is caused by objective features of the transport process (type of cargo, mechanization of loading and unloading equipment, etc.). The wage system used today leads to additional statements which in turn result in fuel waste, distortions of the actual transport needs, and many other negative consequences. Shift and bonus wage payment relates the

driver's earnings, through premiums, additional payments and bonuses, to his work conditions, and to his personal contribution to those quantitative and qualitative indicators of transport which depend on himself, his qualifications and his work attitude. The driver will no longer be interested in additional trip statements, since he will receive incentives to improve the indicators of work for which he is personally responsible.

The calculated annual economic gain from such scientific research work amounts to many tens of millions of rubles. However, due to the difficulties in organizing experimental test verification of the project proposals, it is often impossible to refine them to the level that would ensure their successful implementation in practice. In addition, the more fundamental the research, and the more radical restructuring it promises in its object, the higher requirements are made of the depth and thoroughness of the experimental test stage. At the same time the situation is such that at this stage the production workers appear either as outside observers, or even as opponents of the innovation, since experimentation on a living economic organism brings them nothing except additional concerns and troubles. Motor transport is a commercial enterprise; its primary objective is to fulfill the plan for transport, and it cannot perform the function of a testing ground. As the result, the actual effect, as analysis shows, turns out to be tens of times smaller than the calculated expected one.

Is there need for further proof that without harmonious joint efforts by scientific and production collectives it is impossible to widely and rapidly assimilate the achievements of science, technology and advanced practices? The question is how to radically improve the situation.

Thus, there is no doubt that there is a need for an effective economic mechanism which would be based on autonomous financing, self-support, State norms, and would take into account the interests of everyone on whom the fate of the scientific idea depends. It is very important to ensure strict correspondence between the material gain by the participants in the development, and in the introduction of the innovation, in their contribution of labor. How is this to be achieved?

It appears to us that this process must take place as follows. For the period necessary to implement the innovation (but not exceeding five years) the participants form a temporary scientific-production association (VNPO) within the framework of the given enterprise, association or sector. The organizations establishing such a subdivision on a contractual basis do not change their structure or subordination. They may belong to different ministries and departments.

The temporary scientific-production association operates on a self-supporting basis and is financed from a unified fund for the development of new equipment. If these funds are insufficient, then from Gosbank credits. The organizations participating in the association are the recipients of the funds. They also are the guarantors of repayments of these funds with an established percentage of interest. The effect of the CPSU Central Committee and the USSR Council of Ministers decree "On additional measures to expand the rights of production

associations (enterprises) of industry in planning and economic activities and to increase their responsibility for the results of their work" extends to the participants in VNPO: for them is established a minimum number of fund formation indicators which are used to evaluate the final effect. For the participants in VNPO (this term means the autonomously financed organizations which established it) norms for formation of a material incentives fund, depending on the final effect, are established and remain stable for a five-year period. Besides being granted the additional rights, the participants in the temporary association have their responsibility raised for fulfilling their plan obligations to consumers, as provided in the corresponding contractual agreements. Increased profits remain at the disposal of VNPO participants and are not subject to extraction and contribution to the budget in the form of a free remnant.

For example, differentiated tariffs taking into account specific motor transport conditions are established with their agreement for clients of the motor transport enterprises--participants in the temporary association. With this the final costs to the clients should be reduced. The primary fund formation indicators could be the cost and profitability of transport operations. Profits will remain the source of formation of the incentives fund, and the primary condition for awarding bonuses to engineering and technical workers--fulfillment of contractual obligations for transport quantity and quality. The selection of additional valuation indicators must ensure reliable determination of the actual final gain, taking into account the effect of the innovation being developed and introduced by the temporary association.

The VNPO has the right to independently use the fund for wages and material incentives, established in accordance with normatives, for paying premiums and bonuses for assistance in development, and experimental and broad assimilation of innovations. For services in their introduction in other production organizations, payments from the gain attained by their use are credited to the VNPO. The association gains the right to invite associate workers from other organizations, paying them wages by labor contract agreements out of their wage and material incentive funds.

The organization of a temporary scientific-production association is officially registered by a "Contract by participants in establishing VNPO," an integral part of which is the "Certificate of VNPO participant." The certificate states the resources, obligations to consumers and the budget, effectiveness indicators, fund formation indicators, and normatives for formation of the fund for wages and material incentives. The certificate contains the necessary data for subsequent evaluation of the effect of the innovation on the final effectiveness indicators of the participant in the temporary association.

At what level must the decision to establish a VNPO be taken? On what basis? The answers to these and other questions should be prescribed by special regulations approved by the directive organs. These will provide a legal base for the new and so far unusual formations, providing simplicity and at the same time substantiation for taking the decision to establish a VNPO. Those who take it must first of all be certain that the proposed development has novelty and promises a significant effect, and in addition, can be implemented in an acceptable amount of time. Conclusions on this will be reached by an expert

commission on the basis of data presented in the form of an "Innovation certificate." This reflects the nature of the innovation, the types of resources which will be saved and which will be required, plan indicators which will be affected by the innovation, a list of production facilities, the desired participants in the VNPO, the major stages of work, a list of documentation to be issued as necessary for wide assimilation, etc.

The staff of experts and the procedures followed by the expert commission must ensure professional objectivity and reliability of the conclusions. The preparation of the Innovation certificate falls upon the initiators of the establishment of a VNPO, i.e., the authors of the scientific research, and the decision to present it for the experts' opinion will be made by a laboratory for evaluating the effectiveness of scientific research work at a scientific research institute. It would be desirable that competent specialists from non-interested organizations be among the experts. Their remuneration will be part of cost estimates for the establishment of the temporary association. Upon becoming a member of a VNPO, payments can be made to drivers, repair workers and engineering and technical personnel for performing additional functions related to the introduction of the innovation, and also, when necessary, to invite associate workers for temporary work. The efforts of several motor vehicle transport enterprises can be combined through cooperation. Understandably, in such conditions the contacts between production and science will be strengthened, and progressive methods will be applied in practice.

In some cases this experiment could be carried out within the framework of a single transport administration, and the decision taken at the level of this administration and an institute. In other cases when establishing a VNPO it becomes necessary to change plan indicators and norms falling within the competence of the republic association, ministry or other higher authority. After fine-tuning, the system can be extended to all motor vehicle enterprises of the country. It is sufficient to establish an association from a group of such enterprises engaged in typical transport operations.

How would this matter be organized if the NIIAT has the "rights to experiment" prescribed by the "Regulations on the procedure of establishing VNPO?" Approval for the establishment of a temporary association is given by the expert commission on the basis of an Innovation certificate. The NIIAT and interested participants from motor transport enterprises and clients prepare drafts of the contract agreement and the certificate, which state the fund formation indicators, normatives for wage and incentive fund formation, contractual commitments and other necessary data.

The question arises: how are transport administrations, which include the motor transport enterprises participating in the VNPO, to account for their performance in meeting their ton-kilometer plan? Evidently they should be relieved of an appropriate portion of the plan, since they will be fully responsible for it to their clients. The clients, the participants and the budget will benefit from this. The accountable volume of transport operations in tons and ton-kilometers will be significantly reduced, by the amount of additional statements, i.e., it will become more authentic. And the actual fuel consumption, transport carrying capacity, and use of other resources will improve.

Thus, the voluntary decision to establish a temporary scientific-production association in our example belongs to the participants, embodied by the NIIAT, the motor transport enterprises and clients, and its approval by higher authorities is predetermined by the Regulations on the procedure for establishing VNPO.

How will the supply of materials and equipment for the VNPO be structured? Let us examine this question with an example of organizing an experimental trial in centralization of motor vehicle transport on intercity highways. This can be successfully implemented only if, in addition to enterprises belonging to common carrier and departmentally owned motor transport organizations, manufacturers of mechanized packaging, storage, loading and unloading equipment, the dispatcher service as well as specialists in gathering and computer processing of management data, in construction, road-building and other organizations show interest and will participate in the endeavor.

Each of the potential participants in a temporary scientific-production association works according to a State plan. The supply of materials and equipment is organized accordingly. But what is to be done about obtaining materials, raw materials, instruments, tools, especially items requiring allocations? Here we will refer to the creation of reserve capacities for preparation for production and achieving the output of new types of equipment and materials, as provided in the decree on accelerating scientific and technical progress. The same kind of reserves are needed for prompt allocation of material and equipment resources to the VNPO simultaneously with their establishment.

Experience shows that planning assimilation efforts, with a large number of participants, from above is an unmanageable task. And this is understandable, since the outlined approaches to attaining the goals faced are quite uncertain, and often controversial. Also obvious are the objective difficulties hindering a timely planning of material supply for such an undertaking. Here initiative from below is preferable, the opportunity to provide resources from outside the plan, the readiness and desire of the participants to use their own reserves for operations within the framework of a temporary scientific-production association. We would think that for the first stage of such an experiment with motor transport, the internal material reserves possessed by the potential participants in the association would suffice.

We have arrived at the question who specifically at the institute and in the production organizations participating in the VNPO will deal with the problems discussed, and how their work will be organized and assessed. It has already been said that VNPO is a temporary association on a shared basis, a mechanism for the enterprising and rapid implementation of effective innovations. Its motive force are the material and moral incentives for collective creativity on the basis of a reliable evaluation of the end effect. The reliability is attained by viewing the effect from the innovation in terms of evaluated financial indicators of the autonomously financed participants in VNPO, and the incentives, through granting them broader rights in the utilization of economic incentive funds. How are these conditions to be maintained without complicated organizational restructuring and financial procedures?

We should think that it would be advisable to separate out the expenses and income of each participant in the establishment of the association from its accounts, i.e., to organize a sort of separate personal account for the members of the VNPO creative brigade. This brigade, consisting of specialists of different organizations, works as if it were a single production team with wages paid according to the end results. Some of its members make a creative contribution, while others perform routine work, which, however, is indispensable. Evaluation of the contribution of each is a matter for the brigade itself, for example on the basis of a wage rate, time worked, and labor and creative work coefficients. Within the participating organization it is desirable to plan for a time allotment for work of its personnel in the VNPO brigade.

It should be noted that not all highly effective developments need the use of the VNPO mechanism. It occurs that the connection of an innovation with the end effect is quite obvious and can be easily measured. In such cases it is enough to possess the right to pay the members of the creative brigade out of the funds of saved material resources. If, however (and this occurs much more frequently) the innovation affects many aspects of production and the connection between it and the end result defies direct measurement, it appears to us useful to establish VNPO under the conditions described above.

This is confirmed by a fresh example from today's practice. At the Murom motor transport office (ATK) No 7 of the Vladimir Vladstroytrans Trust, an experiment has been under way since the beginning of the year under the provisions of the decree of the CPSU Central Committee and the USSR Council of Ministers "On increasing the effectiveness of utilization of motor vehicle transport in the national economy, intensifying the struggle against additional work statements in carrying cargo in motor vehicles, and ensuring conservation of fuel and lubricant materials." An improved system for paying drivers' wages proposed by NIIAT is near completion, excluding the elements encouraging additional statements. The comparison of the results of two months with the same period of last year is interesting.

The same 100 motor vehicles of the ATK are managing to handle a 30 percent higher construction work load with a 13 percent cost reduction per ruble. The primary source of the savings is fuel economy: 83 tons in two months, a significant figure, it goes without saying. The ATK is resolving a multitude of new questions on organization of transport, wages, tariffs and other matters with the help of scientific personnel working under contract.

However, neither the ATK nor the institute is rewarded for the attained results. For the motor transport office is not attaining its previous performance indicators. The cost per real unit of transport work has risen, and the real cargo carried in ton-kilometer terms has dropped. As far as the NIIAT is concerned, conducting research on a cost accounting basis provides no material benefits of any kind. The experiment proceeds on enthusiasm. And attempts to expand the circle of its participants meets no support from production workers. It would be another matter if the incentive fund depended on real savings. After all, the 20 percent monthly fuel saving alone amounts to 8,000 rubles in our example. This is not a small sum for rewarding not only the direct participants, but also the production and scientific personnel as a whole.

Let us recall the thought expressed at the June (1983) Plenum of the CPSU Central Committee: it must be so arranged that a manager who took a risk and introduced a new technological process at an enterprise would be materially and morally interested in the introduction of innovations. With the help of the VNPO this task can find one of its specific and effective solutions.

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## BETTER USE OF POTENTIAL OF SCIENTIFIC, TECHNICAL SOCIETIES

Tashkent EKONOMIKA I ZHIZN' in Russian No 5, May 84 pp 34-37

[Article by Corresponding Member of the Uzbek SSR Academy of Sciences T. Rashidov, chairman of the Uzbek Republic Council of Scientific and Technical Societies: "Use More Completely the Potential of Scientific and Technical Societies"]

[Text] To use more completely, with a high yield the available production, scientific and technical potential of the country--the decisions of the December (1983) CPSU Central Committee Plenum focus on this.

One of the important aspects of the accomplishment of this task is the more complete use of the truly inexhaustible potential of the public sector of science and technology. I have in mind the scientific and technical societies, which in our republic unite nearly 300,000 people. This is a mighty army of scientists and specialists, which is called upon to promote the acceleration of scientific and technical progress--on the basis of a uniform scientific and technical policy, the intensification of the integration of science and production and the steady introduction in practice of the achievements of science, technology and advanced know-how.

An effective means of the uniform scientific and technical policy is the state scientific, technical and comprehensive goal programs. Whereas during the past five-year plan in Uzbekistan 13 scientific and technical programs were implemented, during the current five-year plan 19 have already been implemented. Moreover, the republic is taking part in the fulfillment of the assignments of about 80 unionwide programs. In this connection special commissions for the coordination of the activity of the scientific and technical societies of various enterprises and scientific research institutes, which are taking part in the fulfillment of the assignments and stages of the programs, have been set up in a number of boards and councils of the scientific and technical societies. The primary organizations of the societies are actively promoting the further development of socialist competition for the early, effective and high quality fulfillment of the programs on the basis of contracts on creative cooperation.

The scientific and technical community of the republic is performing considerable work, which is aimed at the efficient and economical use of raw material, fuel, energy and other resources. As an example it is possible to

name the Public Bureau of Economic Analysis of the Tashkent Ambary Plant. More than 20 jobs, which analyze the consumption at the enterprise of raw materials, materials and fuel and energy resources, have been performed by its members. The introduction of the recommendations of this bureau saved the factory in just 6 months more than 16,000 rubles.

A noteworthy peculiarity of scientific and technical societies is their ability to join vigorously in a useful cause, to enlist specialists of the most different sectors in it, forming creative groups and "multiple-skill" brigades, and to set up public monitoring of the fulfillment of all the stages of the work.

I will tell about the work which was performed by the scientific and technical community of the Tashkent Planning and Design Bureau of Automated Control Systems, the Central Scientific Research Institute of the Cotton Industry, the Signal Scientific Production Association and the Uzbek SSR Ministry of the Cotton Cleaning Industry--15 descriptions of new instruments and devices for the evaluation of the quality of raw cotton were developed and introduced by their efforts.

Among them is the ASPKh-1 automated information and measuring system for the receipt of raw cotton. The production of such systems has now been organized at the Tashkent Signal Scientific Production Association. They have already been told about in the journal EKONOMIKA I ZHIZN'. I will recall that during the past cotton harvesting campaign ASPKh-1 systems were used when receiving raw cotton from kolkhozes and sovkhozes at the Kara-Su and Aktepinskiy cotton receiving centers of the Pskent Gin Mill--it was possible to automate the entire cycle of operations, which are connected with the determination of the quantitative and qualitative indicators of the raw cotton being received and its making up into bales subject to the degree of moisture and other parameters.

This system carries out with the aid of a computer the automatic issuing of a command, which allows transport with the delivered cotton to be weighed on a truck scales, and the feeding of the results of the weighing into the computer. The time of the analysis of the transport unit with the issuing of an unloading receipt in case of a moisture content of the raw cotton of more than 12 percent comes to no more than 18-20 minutes, in case of a moisture content of the raw cotton of less than 12 percent--no more than 13-14 minutes, which under the conditions of round-the-close intense work, especially at the height of the harvest campaign, ensures the smoothness and continuity of the receipt of raw cotton.

What has been related is a convincing example of the union of science and production and the acceleration of the introduction of scientific ideas in practice. There are quite a few such cases. Suffice it to say that during the first 2 years of the 11th Five-Year Plan more than 300 scientific developments of institutes and organizations of the system of the Academy of Sciences of Uzbekistan were introduced in production. The total economic impact from their introduction exceeded 1 billion rubles.

But alongside it is also possible to cite another figure: about 40 percent of the developments, which are completed by scientific research organizations of the republic, for a long time do not find application in production and lose their practical value, mainly due to the inadequate attention of production workers to the concluding stage--introduction.

Thus, the Uzbek SSR Ministry of the Construction Materials Industry for a long time has not introduced the developments of the Institute of Chemistry of the Uzbek SSR Academy of Sciences, the NIIstromprojekt [not further identified], Tashkent Polytechnical Institute and other institutions, which are connected with the obtaining of new highly economical construction materials. Among them are the technology of obtaining especially high-early-strength cements, recommendations on the use of phosphogypsum when roasting cement clinker and the technology of obtaining agglomerate porous crushed rock on the basis of barhan sands and soft clay.

The introduction of an integrated line for the mechanical stripping, sorting, grading, disinfection and packaging of cotton seeds, which was developed by the Institute of Electronics of the Uzbek SSR Academy of Sciences and makes it possible to obtain from the introduction of just one line an economic impact of about 14 million rubles, is being dragged out.

The economic impact from the introduction of the new AKA-2 cocoon steaming and shaking-out unit, which was developed by the Tashkent Institute of the Textile and Light Industry of the Uzbek SSR Ministry of Higher and Secondary Specialized Education, would come to more than 18 million rubles. However, so far the question of the production of an industrial prototype at the Uzbektekstil'mash Production Association has not been settled.

The fundamental consolidation of science, technology and production into a single national economic complex and the transition to a new stage of their complete integration are one of the most important tasks of the 11th Five-Year Plan. It seems that the possibilities of scientific and technical societies in the adjustment and strengthening of the interrelations in the "science-technology-production" system are still being used far from completely.

This also concerns such a problem as the implementation of measures on new equipment.

In recent years some work has been performed in the republic on the improvement of the organizational structure and technical base of production. During the years of the 10th Five-Year Plan and 2 years of the current five-year plan 67,600 measures on new equipment were implemented, including 7,500 on the assimilation of new types of industrial products, 18,400 on the introduction of advanced technology and 35,800 on the mechanization and automation of production. During this period the number of flow, mechanized and automated lines increased by more than 2,000. The economic impact of the implementation of measures on new equipment is 612 million rubles, 48,200 workers were conditionally released.

And at the same time the fact that the plans of the introduction of new equipment and advanced technology and the mechanization and automation of

production processes in our republic from year to year are not fulfilled, cannot but cause alarm. Thus, in 1981 the fulfillment of the plan on the number of assignments came to 87.6 percent and in 1982 to 85.7 percent. And last year more than half of the ministries and departments of the republic upset the state plan of the development of new equipment. Among them are the Ministry of the Construction Materials Industry, the Ministry of the Furniture and Wood Processing Industry, the Uzglavstroydrevprom [not further identified], the Sredazugol' Production Association, the Uzbekzoloto Production Association, the enterprises of the USSR Ministry of Construction, Road and Municipal Machine Building, the USSR Ministry of Machine Building for Food and Light Industry and Household Appliances and others.

What an extensively field of activity there is here for scientific and technical societies! It is important to organize the matter so that the creative obligations of the primary organizations of scientific and technical societies would be aimed at the fulfillment of the plans on new equipment and would serve as scientific and engineering support of the counterplans and socialist obligations of labor collectives.

We also still have such ministries and enterprises, which have a plan of the development and introduction of new equipment and fulfill it with respect to all the indicators, but here an increase of labor productivity is not noticed. The consumption of materials and energy resources per unit of output is also not decreasing, the proportion of manual labor remains high.

And is the scientific and technical community of these ministries really not able to analyze the state and effectiveness of the fulfillment of the plans on the introduction of new equipment and to help enterprises to achieve good results?

The extensive automation of technological processes on the basis of the use of automated machine tools, machines and devices, standardized modules of equipment, robotic complexes and computer equipment is one of the main directions of the work on the acceleration of scientific and technical progress and the increase of labor productivity.

Much work is being performed in this direction in our republic, and the scientific and technical societies are taking a fruitful part in it.

Thus, the creative association of the members of the Scientific and Technical Society of the Machine Building Industry, particularly the Tashkentskiy traktornyy zavod Production Association and the Tekhnolog Scientific Production Association, has developed and introduced a number of robotized automatic complexes. The robotization of the hot stamping process, in which the technology of the automated electric induction heater has already been introduced, holds a special place in the plans of the creative association.

At the same time it is necessary to note that many previously developed automated processes have a significant drawback--the lack of flexibility, readjustability for new items. Hence the paradox that the automatic line increases productivity, but checks the updating of the output being produced and, consequently, technical progress.

We cannot always allow ourselves the luxury to build plants which will produce similar products for 10-15 years. During this time scientific and technical progress will move far ahead. The machines, which seemed to be a miracle of technology, in 20 years become ordinary or entirely obsolete. In this connection the need to quickly readjust production arises. The logic of scientific and technical progress requires the changeover to flexible automated production systems. By means of them it is possible to increase labor productivity, while having decreased in so doing the number of workers, to ensure the continuous operation of production systems, to increase significantly the output-capital ratio and the machine shift coefficient, to improve the quality of products and to increase their competitive ability on the world market.

The extensive automation of technological processes with the use of robotic complexes and automatic manipulators is first of all the task, which the members of the Scientific and Technical Society of the Machine Building Industry are called upon to accomplish under the supervision of the republic board of the Scientific and Technical Society of the Machine Building Industry. However, it is worthwhile to look at the matter more broadly, and it will become clear that this important problem concerns not only machine building, but also other sectorial republic boards and oblast councils of scientific and technical societies.

Scientific and technical societies can contribute to the solution of this problem and the other problems listed above through creative associations of workers. The assignments, which are aimed at the solution of specific scientific and technical problems which conform to the interests of modern production, are the basis of the creation of such associations. The components of such assignments should be included in the personal creative plans of specialists. However, in our republic for the present only 20 percent of the members of scientific and technical societies are taking part in the work of creative associations. In some sectorial boards, such as the scientific and technical societies of the construction industry, agriculture, the printing industry, the petroleum and gas industries, the proportion of the participation of the members of scientific and technical societies comes to only 11-15 percent.

An important aspect of the activity of scientific and technical societies is the promotion of scientific discoveries and highly efficient inventions, the successful experience of the introduction of research and development in production, the activity of leading scientific research and design organizations, higher educational institutions, associations and enterprises.

Our propaganda should touch to a greater and greater extent upon the most promising directions of the development of science and technology. This is the use of computers and robots, the introduction of a versatile processing method, the obtaining of metals with preset properties and the extensive use of waste-free and energy-saving processing methods.

The need for the promotion of such innovations stems from the enormous economic impact of their use and the great influence on the increase of labor

productivity. I will cite just one example. As is known, in recent years the army of planners and designers in machine building has increased by approximately 1.5-fold, but the time of the development of objects of new equipment in practice is not decreasing. The introduction of automated designing systems (SAPR's) can assist the matter substantially. The following fact testifies to how efficient these systems are: whereas in case of the traditional, manual method on the average 130 hours are spent on the designing of 1 die, the use of the Avtoshtamp automated designing system shortens this process to 7 hours. It is at such innovations that the propaganda should be aimed.

The organizations of scientific and technical societies have everything necessary for the successful accomplishment of this task. The House of Technology is at the disposal of the scientific and technical societies of the republic. In the past 2 years alone 530 measures, in which more than 57,000 people took part, were implemented at it. In all 103 people's universities of technical progress and economic knowledge, about 2,000 public bureaus of technical information and 7,500 courses for the increase of scientific and technical knowledge and production skills have been set up and are actively operating.

But can we say that the abundant possibilities of scientific and technical propaganda are being fully utilized? Of course not. In particular, far from everything is being done for the increase of the technical level and occupational skills of workers under the conditions of the continuous updating of production. For the present a significant portion of the workers and kolkhoz farmers are not yet encompassed by the systematic promotion of scientific and technical knowledge. Such a promising direction of the work of scientific and technical societies as the organization locally, on the initiative of the scientific and technical community, of consultation centers, by means of which the promotion of the achievements of science among the broad masses of production specialists is carried out, for the present is being inadequately developed.

The comprehensiveness of scientific and technical propaganda and the use of diverse means and form are to a significant extent a guarantee of its successful conducting. Closer contacts of the scientific and technical societies with the Society for Knowledge, the All-Union Society of Inventors and Efficiency Experts, the Uzbek SSR State Committee for Publishing Houses, Printing Plants and the Book Trade and organs of scientific and technical information are necessary for this.

At the December (1983) CPSU Central Committee Plenum it was stressed that much will depend on how we mobilize the collectives of enterprises and scientific research and design organizations, engineering and technical personnel and scientists for the acceleration of scientific and technical progress.

One of the important components of this task is the mobilization of such a mighty reserve as the scientific and technical societies.

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MATERIAL, TECHNICAL SUPPLY OF REGIONAL SCIENTIFIC, TECHNICAL PROGRAMS

Tashkent EKONOMIKA I ZHIZN' in Russian No 5, May 84 pp 38-39

[Article by R. Sklyadnev and V. Machigin: "Some Problems of the Material and Technical Supply of Scientific and Technical Progress"]

[Text] "...We are obliged to deal constantly and persistently with the acceleration of scientific and technical progress," it was noted at the December (1983) CPSU Central Committee Plenum. As is known, the 26th CPSU Congress specified the basic directions of the accomplishment of this task, which constitute a set of measures, which encompasses all the aspects of technology and science. One of these direction is the formulation and implementation of a comprehensive program of scientific and technical progress and goal programs on the solution of the most important scientific and technical problems.

These programs are being given concrete expression with not only a sectorial, but also a regional breakdown.

In the Uzbek SSR during the 11th Five-Year Plan research, which is connected with the production and primary processing of raw cotton, the efficient use of water resources, the increase of the production of vegetables, the use of secondary fuel resources and the saving of fuel resources, the development, with the use of local raw materials and industrial scraps, of efficient porous fillers and the introduction on their basis of new types of light-weight reinforced concrete components and the elaboration of effective conservation measures, is being conducted in accordance with them.

The further improvement of the organizational forms of the consolidation of science with production--the setting up of new scientific production associations and sectorial laboratories--is envisaged.

Particular attention is being devoted to the gradual transition from the introduction of individual machines and technological processes to the use of highly efficient systems of machines, equipment, instruments and processing methods, which make it possible to mechanize and automate all the production processes and especially ancillary, transportation and warehouse operations.

In republic industry it is planned by 1985 to completely mechanize and automate more than 420 enterprises and shops and 538 sections and to put into operation more than 780 mechanized flow conveyor lines and automatic lines.

The work on the development of the Karshi and Dzhizak territorial production complexes is being continued for the purposes of the comprehensive development of Uzbekistan and the effective involvement in production use of the abundant land and mineral raw material resources of the virgin oblasts.

Thus, an entire set of regional programs of a different scale, duration, level, importance and supply with resources is being formed in the republic. But at the present stage they are all key ones for the further development of the national economy. It is possible to depict this set organizationally as a set of comprehensive programs of the republic, individual oblasts, rayons, large cities and territorial production complexes. In connection with the large amount of work on the coordination and assurance of the implementation of these programs and the difficulty of their interconnection with the republic national economic plans the need is arising to formulate the initial factors of the organizational and technological method of the implementation of regional scientific and technical programs.

The need for this is also due to the lack of a management mechanism on the regional scale.

In the republic various departments of the Uzbek SSR State Planning Committee are taking part in the elaboration of regional programs, they are also carrying out procedural supervision. There are no such departments on the oblast and rayon scale, public councils, which could assist the scientific and technical development of individual oblasts and rayons, are also absent here. For this reason the questions of the financing and material and technical supply of regional scientific and technical programs (RNTP's) are not being settled at the proper level. The analysis of practical experience makes it possible at present to distinguish two organizational principles which are the basis for the supply of such programs:

the supply with material resources individually by each ministry or department, which is taking part in the implementation of the regional scientific and technical programs;

the cooperation of assets on the basis of the proportionate participation of ministries and departments.

In the former case the ministry or department (as a rule, a large production sector) takes upon itself all the material expenditures which are connected with the initial period of the implementation of the program. At the same time under the conditions of the territorial and sectorial systems of management the implementation of regional scientific and technical programs is carried out by the forces of several all-union and republic ministries and departments. Such participation in a single process, on the one hand, makes it possible by the use of the already created capacities and the transfer of equipment and materials to set to work quickly on the accomplishment of the main goals, for the sake of which the work is being performed. On the other

hand, this has the result that objects for sectorial purposes (procurement and processing enterprises, shops and services) are built at the same time, while this signifies the inefficient use of material, manpower and financial resources. The exporting of local construction materials by some organizations and at the same time the importing of similar materials by others are frequently observed.

In the latter case the complicated problem of the distribution of the expenditures on the solution of the problems of regional scientific and technical programs among the ministries and departments arises. Here the tendency to decrease one's own share (in terms of the others) appears. It should be added to this that the management staff of ministries is diverted for numerous consultations, coordinations and so on. As a result the complete implementation of the programs is made difficult or is dragged out.

And although the concentration of the resources of ministries by means of proportionate involvement is a step ahead, as compared with sectorial supply, still proportionate involvement cannot serve as the basis for the supply of regional scientific and technical programs. The possibilities of sectors are different, this circumstance has the result that it is impossible to elaborate principles of proportionate involvement, which are identically acceptable both for each of the sectors and for the entire program as a whole.

It is necessary, apparently, to link the problem of the concentration of material resources for the supply of regional scientific and technical programs with the questions of the formation of management organs of the regional scientific and technical programs. Here the problem of interdepartmental coordination and the monitoring of the timely and full allocation by ministries and departments of material resources, in conformity with the approved program of the implementation of regional scientific and technical programs, comes to the forefront.

In order to accomplish this task, the material expenditures should be eliminated from the plans of the supply of sectors and they should be used centrally, by means of specialized special-purpose organizations, under the control of territorial organs. Such a procedure, in our opinion, is more efficient than the collection of materials resources from ministries and departments or the autonomous supply of programs. It is necessary to assign the functions of the coordination and the monitoring of the fulfillment of regional scientific and technical programs to the Uzbek SSR State Planning Committee, while in the area of material and technical supply to the republic State Committee for Material and Technical Supply. The territorial organs locally should establish the needs for all types of resources, which are used for the regional scientific and technical programs, and coordinate locally the implementation of these programs. It should be noted that experience of the successful implementation of various regional scientific and technical programs already exists in the country, particularly in Belorussia and the Ukraine. The practice of combining sectorial and territorial planning and its implementation in the area of regional scientific and technical programs have shown their effectiveness.

The existing procedure of the organization and planning of the material and technical supply of scientific organizations places them in an equal position with industrial enterprises. This is incorrect, since scientific production has its own specific nature, which distinguishes it as a special type of consumer of material and technical resources. The basic nature of the research, which is performed by scientific and scientific research organizations, is responsible for their needs for a wide assortment of different types of industrial products. Here, as a rule, these needs are characterized by the small sizes of the batches of products, which are being ordered--they come to 1 to 4 percent of the total amounts of resources. For this reason such organizations fall into the category of minor consumers, who at times experience certain difficulties in the supply with raw material resources.

The study of the nature and structure of the consumption of material resources by scientific organizations attests that instruments, laboratory equipment, measuring and other equipment make up about 60 percent of the total amount of resources being consumed. Here along with the demand for instruments and equipment of constant use the need for instruments and other equipment of short-term use periodically arises for these organizations.

Taking into account the role of scientific research and scientific organizations in the acceleration of scientific and technical progress, it seems expedient to form them into a priority group of consumers. The question of the centralized supply of scientific organizations in accordance with the entire list of products being used through the organs of the Uzbek SSR State Committee for Material and Technical Supply, bypassing the fund-holding ministries and departments, is ripe; for this purpose it is necessary to set up a specialized organization in the system of the Uzbek SSR State Committee for Material and Technical Supply.

The rental of scientific equipment, instruments and other equipment, as well as the development of a system of services, for example, production services (cutting, the cutting out of materials, packaging in small containers, the repair of equipment and so on), transportation and information services and others, are advanced forms of the meeting of the demand of organizations of the research type. However, these forms are being used inefficiently, due to the lack of the corresponding material and technical base. Apparently, it would be advisable for ministries and departments to share in the construction in the system of the Uzbek SSR State Committee for Material and Technical Supply of rental centers, special facilities and shops for the centralization of a number of ancillary production processes.

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## NOVGOROD OBLAST ENTERPRISES SPEED UP APPLICATION OF R&D RESULTS

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 84 p 11

[Article by N. A. Antonov, first secretary of the Novgorod CPSU Obkom, in the Library of Advanced Know-How section]

[Text] Not only the need to ensure larger volumes of output of better quality, but also the existing large production capacity and the changeover to the intensive path of economic development warrant our concern for accelerating the progress in science and technology. Merely within industry in our oblast, average annual R&D costs have reached nearly 30 million rubles, 43 percent more than under the preceding five-year plan.

During his meeting with workers of the Serp i Molot Plant, K. U. Chernenko termed the need to reequip industries, and to apply advanced know-how and the latest developments in science, as "the requirement of our time" and "the command of our era." The party organizations in our oblast are concentrating their efforts at present specifically on the solution of this task. We are striving first of all to maximally utilize the experience of the foremost enterprises.

The essence of the best collectives' experience in the oblast is that development of efficient technological processes, training of personnel, and extensive technological reequipment must proceed parallel with the development of new products. This approach can shorten to a half or a third the cycle from a product's development to its production, and it is also able to avoid the mistakes that resulted in the past from a lack of coordination among the designers, industrial engineers and production personnel. The practice of forming ad hoc teams to develop new technology, and services to introduce it, has proven suitable.

At the Kompleks Production Association, for example, the addition of well-equipped machine-building capacity has made it possible to accelerate the development and production of highly efficient technological equipment, robots, and parts and subassemblies for flexible automated production systems, in order to supply the association's own needs and other enterprises within the industry as well.

Thanks to technological reequipment, and to integrated mechanization and automation, the collective of the Volna Production Association has been able to

increase its production volume by 42 percent merely within the past 3 years, and to raise its labor productivity by 40 percent during the same period.

We could go on citing such examples. The party obkom feels that significant progress can be made only if the lagging collectives adopt the available experience of the best collectives. Consider, for example, the problem of reducing manual labor. If the lagging enterprises and organizations were to reduce manual labor at least to its present oblast level, this would permit mechanizing the work now being done by more than 5,000 workers.

For the time being, however, this process is proceeding very slowly: during the first three years of the current five-year plan, the proportion of manual labor has been reduced in all by merely 1.5 percentage points. We are firmly convinced that this is due first of all to piecemeal mechanization and automation dissipated among the individual operations, without any significant impact on the technology as a whole. Another reason is the inefficient production structure at a number of enterprises and associations that have neglected to specialize and concentrate their production in due time, which would have enabled them to properly mechanize the labor of their workers. And as the third and final reason we must mention the slow pace of mechanization. It is due to the mental inertia of many specialist and production organizers, their lack of initiative, and their adherence to the old way of doing things. And it is due also to the party organizations' failure to set demanding requirements for them.

In November of last year, the obkom's plenum discussed all this in principle when it considered the tasks stemming from the Decree of the CPSU Central Committee and the USSR Council of Ministers on Measures to Accelerate Scientific and Technological Progress in the National Economy. After analyzing the situation, the plenum elaborated comprehensive measures to solve four interrelated tasks: a substantial rise of labor productivity; a reduction of manual labor, an increase of the return on investment, and more efficient utilization of manpower resources; economization of material and energy resources, and lower production costs on this basis; and a distinct improvement of product quality, reliability and competitiveness.

A recently held scientific and practical conference devoted to this topic was sponsored by the party obkom, the editors of EKONOMICHESKAYA GAZETA, and the Academy of the National Economy attached to the USSR Council of Ministers. The conference has helped us to generalize the accumulated experience; to call it to the attention of the party, soviet, trade-union, Komsomol and economic organs; and to link more closely the basic forms of the party's political work and economics education, with the problems of accelerating technological progress. This is what the present issue will be all about.

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## ADVANCED KNOW-HOW REPORTS, PROPOSALS

Moscow EKONOMICHESKAYA GAZETA No 30, Jul 84 pp 11-14

[Text] V. V. Soroka, rector of  
Novgorod Polytechnical Institute:

Specialists estimate that the software for flexible automated production systems contains several hundred thousand instructions. It takes more than 50 man-years to write this software. In other words, a team of 20 to 30 experienced programmers must work 2 to 3 years to develop the software for flexible automated production systems.

The problem of training personnel is especially critical in this context. The new technology in the flexible automated production systems sets stiff requirements regarding the scope of the specialists' knowledge, and the depth and quality of their training as well. Regrettably, the specialists whom the higher educational institutions graduated in the past, and even the ones they are graduating now, do not meet present-day requirements. Yet, the specialist unable to use electronic computers in his work must be regarded as someone who cannot do sums.

There are a few things that we have undertaken on our own initiative: the training of students in the technology of robotized machine building has begun as a new specialty; the problems of offering new specialties for flexible automated production systems have been solved; and the institute has begun to organize its detached departments at the enterprises. However, these are only half-measures. The interested enterprises must help to introduce new specialties, establish laboratories and strengthen the institute's material resources.

S. K. Shmeleyev, director of  
the Staraya Russa Tool Plant:

Many branches of the national economy are now enthusiastically engaged in building manipulators of their own design. There already are more than 300 types. But sectoral division is hampering efforts to develop the production of the best models. Recommendations are lacking also for the development of standard robotized technological processes.

We believe it is high time to establish a large national scientific production center for robotics and flexible automated production systems, with a developed scientific base and material resources.

N. K. Mikhaylov, chief engineer  
of the Start Production Association:

The certification of jobs can become an effective tool for determining in a substantiated manner the ways of using capital investments for the technological reequipment and reconstruction of existing industries. Certification can be the most effective only if it becomes one of management's constant functions.

To this end, as evident from the experience of the foremost collectives, the measures for the certification and streamlining of jobs must be included in the enterprise's technical, output and financial plan, and in the collective contract. In this way the certification of jobs is placed on a planned basis.

S. M. Zolin, director general of the Production Association for Special Automatic Equipment:

Constant product renewal and improvement of product quality demanded of us increased metrological support for production. The introduction and effectiveness of an integrated system for quality control depend to a large extent on our ability to properly and accurately measure, analyze and determine product quality.

Today it is necessary to solve an entire complex of tasks associated with metrological support for production. These include: metrological review of the design plans, specifications and technical manuals; metrological certification of measuring methods and of measuring and testing equipment; participation in the selection and designation of measuring equipment and methods; and a number of other tasks that are no less important.

To solve these tasks, our enterprise has drafted a long-range plan that includes all the measures intended to improve metrological support for production. Comprehensive analysis preceded the drafting of the plan.

As a result of this long-range plan's fulfillment, the expansion of the association's right of departmental certification is already earning it additional profit averaging over 7,000 rubles a year.

V. A. Laptikhovskiy, manager of Gosbank's Novgorod Oblast branch:

As we very well know, there are three basic sources for financing the enterprises' reconstruction and technological reequipment: budgetary allotments, the enterprises' own resources, and bank credit.

Unfortunately, long-term bank credit is "functioning" very poorly in industry for the time being. Its share last year, for example, was less than 1.0 percent. Why? We attribute this to the strict rules for approving credit. Thus, according to the instructions of Stroybank [All-Union Bank for the Financing of Capital Investments] on providing long-term credit for the state's capital investments, credit may not be used to finance the cost of new construction if the capital investment's payoff period exceeds 5 years. Meanwhile in industry

the payoff period, calculated on the basis of the standard coefficient of efficiency, is 6.3 years. It would be expedient to bring these indicators in harmony, using as the criterion for approving credits the average payoff period of the given industry. This would permit the wider use of credit that repays the state's invested resources faster.

Moreover, economic units operating at a loss or whose profitability is low are unable to obtain credit for reconstruction or the expansion of their production. In our opinion, they should be able to obtain credit for such purposes, provided the calculations show that it is feasible to raise in this way the enterprise's profitability to the average level of the given industry. The incentive role of credit would manifest itself in this manner.

V. A. Borovkov, director general of the Planeta Planning and Technological Association:

It is generally recognized that the level of electronics determines technological progress in practically every sphere of the country's economy. At our association there are enough examples to demonstrate that our production is changing daily and even by the hour.

Naturally, not only the technology is being perfected, but also the people are changing. Technological progress is setting for the worker a number of qualitatively new requirements.

For this purpose we have set up an office for the aptitude testing of our personnel. It provides vocational guidance for up to 1000 persons each year. As a result, the workers in every operation are suitable for their trades.

A. K. Gulyayev, director of the Woodworking Machinery Plant:

The rapid pace of progress in science and technology demands of all workers that they continuously refresh their knowledge. Much time and money are being spent at present on retraining the personnel. The paradox is that at the GPTU [municipal vocational and technical school], which trains lathe operators for our plant, the student sees in the shops the same antedeluvian vises and venerable DIP-200 lathes. But when he comes to our plant, we are supposed to assign him to an intricate and expensive N/C lathe.

This practice is in conflict with the idea of accelerating the practical application of the advances in science and technology. Therefore the Ministry of the Machine Tool and Tool Building Industry, from which we have repeatedly requested help, should not begrudge the money for the reconstruction and technological reequipment of our industry's main vocational and technical schools. Equipping these schools with modern automatic lathes will unquestionably help to enhance the prestige of lathe operators.

G. I. Yurov, chief of the Oblast Administration of Vocational and Technical Education:

The base enterprises should introduce certain changes in organizing the students' practical training, in view of the trend toward the brigade form of work

organization. They should proceed more boldly with setting up youth brigades, assigning some of the best outstanding workers to lead these brigades.

I. N. Piterkov, deputy chief engineer of the Planeta Planning and Technological Association:

Assembly operations are the most labor-intensive in the production of semiconductors. The proportion of eye-straining assembly operations within the overall technological process is 17 to 30 percent. To reduce these operations, we prepared a comprehensive target program through 1990 that calls for a plan-conforming changeover from manual assembly to semiautomatic and eventually automatic assembly, and for the development of automatic lines and sections.

Already in the first three years of the current five-year plan, we successfully introduced over 300 units of sophisticated equipment, freeing thereby 800 workers.

Development of the first model of an automatic machine for the soldering of crystals has now been completed. It is a new-generation machine with microprocessor control and has automatic television, so-called machine vision. One operator is able to attend to several machines.

Thanks to such innovations, the level of mechanization within the association has reached 72.2 percent.

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## BRIGADE MASTERS NEW TECHNOLOGY FASTER

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 84 p 11

[Article by B. S. Seleznev, Hero of the Soviet Union, leader of the lathe operators' brigade at the Volna Production Association, in the Library of Advanced Know-How section]

[Text] Practice shows that accelerated introduction of highly productive new equipment depends to a large extent on using collective forms of work organization. New sophisticated equipment is mastered faster within a brigade. Usually management is obliged to assign a skilled worker especially to learning the operation of the new equipment. It is different within a brigade. Here it is always possible to assign skilled workers to master the new equipment, without jeopardizing plan fulfillment.

When a new machine tool is assigned to our brigade, for example, it is the task of every member of the brigade to study its operation and then to gain practical experience on it. Thus if a worker is ill or on vacation, the machine tool will not be idle. This has become the rule in our shop. Only brigades operate all sophisticated equipment: automatic lathes, transfer machines, program-controlled turret lathes and milling machines, and N/C lathes and milling machines.

In January 1981, I was leader of a brigade that operated N/C lathes. The goal was then set to sharply increase the stock of N/C machines, and to make this the basic type of equipment in the section. The task of mastering N/C lathes in a shop is fairly complex. The setup time of N/C multitool lathes is considerably longer than for milling machines. One must be thoroughly familiar with the types of racks housing the N/C machines' control systems (five different types in all). Therefore we decided that within the brigade there must be complete mutual substitution and combination of skills: every lathe operator must also be a tool setter. There were initial difficulties: not enough tools, and not all operators had been trained to set up the machines. At that time, five workers were assigned to operate six N/C lathes. Now our eight-man brigade operates 13 N/C lathes in two shifts. In addition, two new lathes have already been installed, and we are placing them in operation.

Under our production conditions, where there is a great shortage of floorspace, practical considerations demand that the new N/C lathes be placed in operation

as quickly as possible. The point is that for every new N/C lathe in our section, we usually have to surrender two universal lathes. Yet, the production schedule of the section and shop is growing, not declining. This fact places special responsibility on the technological service of the shop and plant, and on the brigade itself.

The equipment assigned to the brigade operates efficiently two shifts per day. This is enhanced not only by the observation of production and technological discipline, the coordination of actions and mutual interchangeability, good morale and profit-orientation, but also by the collective's constructive attitude, constant upgrading of skills, social activity, and solidarity.

Each year the brigade receives instruction in the most advanced work methods and practices. All the operators know how to set up their machines and to correct the setup.

Labor productivity in the brigade has risen 24.1 percent in three years. The shift index of the brigade's equipment is 1.98.

Despite the continuous expansion of the stock of N/C lathes assigned to our brigade, we do not anticipate any increase of its size. We see the solution in the application of mechanical assistants--robots and flexible automated production systems. This year our brigade plans to introduce two robotic systems (flexible automated production modules), and the necessary technological preparations for this already are underway.

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## NEW TECHNOLOGY A SOURCE OF HIGH EFFICIENCY

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 84 p 12

[Article by F. V. Kondrin, secretary of the Novgorod CPSU Obkom, in the Library of Advanced Know-How section]

[Text] The acceleration of progress in research and development is a complex task of many levels. The ways of solving it include: acceleration of the reconstruction and technological reequipment of enterprises; wide practical application of R&D results; improvement of product quality; perfection of production's organization and management; and creation of conditions conducive to highly efficient labor.

The production collectives in the oblast have accumulated a certain amount of experience in this work. During the past three years, the enterprises in the oblast have placed in operation 143 automatic continuous-flow transfer lines and production lines, and have completely automated and mechanized 97 shops and sections. The total number of such shops and sections has increased by 19 percent over 1980. The number of N/C machine tools has doubled during the same period, and the number of automatic manipulators has trebled.

In three years, the number of measures to introduce R&D results has increased nearly 24 percent. Since the start of the current five-year plan, the rise of labor productivity has saved 14,000 workers and accounts for practically the entire increase in output.

However, the rates at which R&D results are being introduced should be faster, and their return much greater. Therefore the party obkom is focusing the attention of the party, soviet, social and economic organs on accelerating the integrated mechanization and automation of production and the technological reequipment of the enterprises, and on mastering faster the output of new products with good technical and economic characteristics.

In the matter of integrated mechanization and automation we are attributing great importance to the introduction of flexible automated production systems in industry. These are production complexes, sections, shops and, eventually, entire enterprises that use unmanned technology and are controlled by modern electronic computers. On the basis of group technology, they are able to solve the integrated mechanization and automation of series, small-lot and even single-item production.

There are certain prerequisites for the introduction of flexible automated production systems: availability of N/C equipment; experience in using robots; better-trained engineers; and the capabilities of our polytechnical institute. On the initiative of the party obkom and with due consideration for these prerequisites, an oblast program has been elaborated for the introduction of flexible automated production systems through 1990. It calls for introducing flexible automated production systems at a number of enterprises, in a variety of processes: machining, electroplating, assembly, etc. To manage the realization of this program, a council for coordinating the development and introduction of flexible automated production systems has been formed within the technical and economic council attached to the CPSU obkom. Base enterprises have been designated to develop flexible modules, by types of processes. With due consideration for its capabilities, for example, the Staraya Russa Tool Plant has been designated the base enterprise to develop flexible automated production systems for machining.

The accelerated perfection of production must be accompanied by equally fast and efficient product renewal and improvement of product quality. In the final outcome, the better quality, reliability and durability of a product also mean higher labor productivity.

The activity of the council for promoting technological progress, attached to the Borovichi CPSU Gorkom, can serve as an example of purposeful work to improve the efficiency of production. This council has been operating 7 years. Much of its work is related to the problems of accelerating the practical application of R&D results. The council is devoting special attention to the planning of this work and its link with achieving specific final results. All enterprise plans are carefully analyzed and studied. When necessary, the enterprises receive assistance to modify and implement their plans. Such specific work is typical also of a number of other voluntary organizations attached to the CPSU gorkoms and raykoms, and to the oblast party organization.

The party locals have commissions to audit management's activity regarding the faster rise of labor productivity, the improvement of workmanship, the introduction of new forms of work organization and advanced know-how, and the practical application of the advances in science and technology.

The review of socialist pledges in adversary proceedings is a firmly established work practice. Each year the CPSU gorkoms and raykoms review the socialist pledges of the enterprises and make recommendations to perfect the structure and content of the socialist pledges in accordance with party principles, and to make the pledges more demanding. The city and rayon pledges must then be defended before the CPSU obkom.

We will strive also in the future to strengthen the party's influence among the workers concerned with the development and mastering of new technology, and to seek new and more efficient forms of this work.

Pursuant to the resolution of the CPSU obkom's plenum, work has begun on elaborating a system for planning the development of progress in science and technology within the oblast, with a series of comprehensive rayon, municipal and oblast target programs to solve the most pressing problems: the reduction of

manual labor, mastering the output of the most important types of products, improving product quality, economizing materials and energy, introducing flexible and waste-free technologies, etc.

Under the current five-year plan, labor productivity in industry within our oblast must be increased by nearly 30 percent over 1980. This is a complicated task that will require no small effort and considerable resources. Since the start of the five-year plan, this indicator has increased by 20.3 percent. To complete the fulfillment of this task we must utilize more fully the existing possibilities and available resources, act more boldly and with initiative, and persistently introduce new technology and advanced know-how.

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## COMMISSIONING, STARTUP OF NEW CAPACITIES MUST BE FAST

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 84 p 12

[Article by Yu. A. Ivanov, director general of the Azot (Nitrogen) Production Association, in the Library of Advanced Know-How section]

[Text] Technological units of large capacity have appeared at our enterprise in recent years. This has enabled us to combine several small units and machines into larger ones, simplify the flow diagram, ensure the more reliable operation of automatic controls, and significantly reduce the size of the operating personnel.

One of our important tasks, therefore, is the fast commissioning and startup of new capacities. We begin with the accelerated training of the personnel. In addition to the traditional forms, here we use also new forms of training: special tests, business games, training on mockups and in training devices, and psychological training.

We are devoting close attention to working with the design plans and specifications already in the stage when the future machines, units and flow diagrams are being developed. Changes in the submitted plans and designs are not infrequent. This has happened, for example, in planning and designing the production of formaldehyde, carbamide, and nitrophoska [NPK fertilizer]. Entire technological units were changed; and in the case of carbamide resin, we completely changed the technology itself. Eventually these changes enabled us not only to operate these processes at their design capacities, but to exceed them as well.

Overseeing the high quality of construction and installation work, and the engineering preparations for trial operation and commissioning are a no less important stage. Here a group of experts play an important role. Their task is to identify the bottlenecks and to select the most economical and fastest mode of startup. During the engineering preparations for the trial operation and commissioning of the nitroammophoska plant, for example, this group proposed trying out the final, most complex technological operations, and then to complete the construction and trial operation of the initial stages. This shortened the startup time of production by two months.

Last year we formed a so-called diagnostics group. The main task of this group is to monitor the operation of the basic technological equipment and machinery and to prepare maintenance requirement cards. On the basis of this group's observations and recommendations, the association turned to the ministry for permission to schedule overhauls of the ammonia plant at 18-month intervals, instead of the 12-month intervals used previously to schedule overhauls. This increases the average annual output of ammonia by 25,000 tons, or by 2.5 million rubles in value terms.

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## STUDIES HELP PRACTICAL APPLICATION OF R&D RESULTS

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 84 p 12

[Article by Z. N. Fokina, chief of the Novgorod CPSU Obkom's Political Education Center, in the Library of Advanced Know-How section]

[Text] The oblast council for economics education recently approved the Borovichi Refractory Combine's experiment to strengthen the role of the study of economics in the practical application of the advances in science and technology. Here 60 percent of the workers have studied economics. Nearly 3,000 students completed the two-year curriculum "Advances in Science and Technology, and the Economy."

Management and the social organizations determine each year which outstanding worker's experience should be widely assimilated in production. At the monthly seminars for propagandists, they explain the essence of the outstanding worker's experience, often with visits to his work station. For example, the experience of M. I. Kanayev's integrated brigade was studied in this manner. The brigade had proposed on three occasions a revision of the performance norms. This contributed significantly toward the changeover to the brigade form of work organization at every mining enterprise of the combine.

Each curriculum at the combine is supplemented by mandatory annual economic conferences, for the shops and the entire combine. At these conferences and during the preparations for them, the workers and specialists of the individual shops submit from 20 to 100 specific proposals for increasing the efficiency of production. In 1984, such conferences were devoted to uncovering reserves for increasing labor productivity by 1.0 percentage point in excess of the plan, and for reducing production cost by 0.5 percentage point. All this ensured a 1.5-percentage-point rise of labor productivity in excess of the plan during the first half of this year.

The enterprises and organizations of the oblast are summing up the results of the academic year in the system of economics education. The best experience in organizing these studies is being analyzed, and specific measures are being planned to make them more efficient. The organizers of these studies and the propagandists are directing their efforts toward fulfilling the requirements of the CPSU Central Committee's June 1983 Plenum that economic propaganda and economics education must be subordinated entirely to the needs of intensifying production and of developing modern economic thinking and socialist entrepreneurship.

## AUTOMATION REQUIRES INTEGRATED SOLUTIONS

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 84 p 13

[Article by O. F. Mel'nikov, chief engineer of the Elkon Production Association, in the Library of Advanced Know-How section]

[Text] The introduction of industrial robots is now the basic direction of mechanizing labor-intensive manual operations at our production association. Our plans for automating series production, on the basis of developing flexible automated modules, likewise call for the application of industrial robots.

Tens of automatic manipulators are now in operation in the shops where black-and-white and color picture tubes are being assembled. About 20 automatic manipulators are now in the stage of installation and debugging.

The association's accumulated experience permits the conclusion that a basically new technology can provide a fast return only if the general level of technology and work organization rises concurrently with the new technology's introduction. And this in its turn requires extensive preparations. It is not enough to simply install robots. We must also solve in an integrated manner the problems of shaping the technology and organizing production with the use of these highly complicated mechanisms.

We must admit that we failed to realize this immediately. We installed the first automatic manipulators to unload the picture-tube envelopes from the drying machines onto a conveyer. For the startup of these manipulators it was necessary to supply compressed air, install detectors, modify the conveyer's suspension and make a few simple parts. The costs were not significant.

But the next system, for washing the envelopes, required changing the entire section's layout: the conveyer had to be repositioned, and the washing machines moved. The robot itself had to be modified. To synchronize its movement with that of the conveyer, the manipulator had to be mounted on a special carriage, and all conveyer suspensions had to be redesigned.

The installation of robots in another section made it necessary to develop and build special robotized technological equipment and to completely change the layout of the conveyers.

The robotic system now being introduced to coat the screens with phosphor, and to evacuate and seal the picture tubes, again requires changing the layout of the conveyers, modification of the technological equipment and many other changes, up to the development of special sensors.

Thus the application of robotic systems has brought to the fore the problem of integrating the solutions in the area of automation. This is reflected in the comprehensive program for perfecting production under the current five-year plan. The program's objective is to completely mechanize manual labor in basic production. We are now focusing attention on the stage of planning and designing so as to raise the technological level, improve the organization of production and to match the capabilities of new technology with the conditions that its operation requires.

This applies also to the automation of auxiliary processes. This year we are planning to completely mechanize materials handling in the storerooms, using rack and floor stackers. A pneumatic system for unloading aluminum oxide and supplying it to the individual work stations has permitted the complete elimination of manual labor from these operations.

This approach produces noticeable results. The level of mechanization in the auxiliary processes, for example, is 78 percent this year as compared with 55 percent in 1980. In the final year of the current five-year plan, we are planning to boost this indicator to 80 percent.

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## FROM ROBOTIZED SECTIONS TO ROBOTIZED SHOPS

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 84 p 13

[Article by V. P. Konstantinov, shop superintendent at the Plant imeni 24th Party Congress, in the Library of Advanced Know-How section]

[Text] Our shop took the first steps toward introducing industrial robots five years ago. At that time robots were installed at several single-operation work stations in the stamping and die-forging section. And although the robots were fully able to handle the work they were assigned, this innovation did not offer any special advantage. The operators worked at their presses as before, producing the same parts.

It was decided to fully automate stamping and die-forging, using multiposition robotic systems that could produce finished parts. This work was completed last year. Instead of 40 workers, the section now has only six tool setters-operators, three in each shift.

What has this meant? More than 90 percent of the stamping and die-forging is being done at present automatically, in the robotized section. The workers have been relieved of tedious heavy physical labor. And finally, the psychological aspect is no less important: nobody at the enterprise has any doubts about the efficiency of robots.

However, our experience with the operation of the first completely robotized section indicates that there is much to be done even after the installation of robots, to help them "become accustomed" to production.

We still have to solve the problem of improving the operational reliability of robotic systems, increasing the capacity of the loading devices, and making the robots more universal.

Thus the robotized stamping and die-forging section must become a peculiar proving ground for testing the new technology under the actual production conditions. This is the more necessary and useful because we foresee in the not too distant future the establishment of a robotized shop with automated materials handling.

## PRODUCTION ASSOCIATION DEVELOPS, INTRODUCES NEW TECHNOLOGY

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 84 pp 13-14

[Article by A. A. Nesterov, director general of the Kompleks Production Association, in the Library of Advanced Know-How section]

[Text] The collective of our production association is devoting close attention to the introduction of new technology and of equipment to mechanize and automate production.

In my opinion, the practical application of the advances in science and technology can be solved optimally only within an association that has its own R&D base for the integrated development of products, technology and automation equipment. It must have also toolmaking and machine-building capacity to manufacture and supply new equipment for the association's plants. Such an association is able to efficiently develop the directions in technology for which it has been assigned responsibility.

Our association has an extensive R&D base, a machine-building plant that specializes in modern technological equipment, and also a toolmaking plant. The other enterprises and plants are specialized on the principle of product and technological similarity.

Thanks to this structure, we have been able to shorten considerably the time required for the introduction of new technology and the mastering of new production, to develop and build highly productive technological equipment, and to introduce robotics.

To develop and introduce new advances in science and technology, within the design and technology office we have organized sections for the promising directions: computer-aided design, robotics, powder metallurgy, and automatic control equipment (using electronic computers and microprocessors).

As a rule, the R&D results are applied in the association's machine-building plant that produces about 450 units of new technological equipment a year, including industrial robots (250 robots have already been built), N/C machine tools, transfer lines with built-in manipulators and automatic control, automatic machine tools for various purposes, and other equipment.

This has enabled us to establish the technological base necessary to implement our target programs for integrated automation, including the development of

flexible automated production systems using automata, transfer lines, robots, materials handling systems, and automatic control systems.

The association has completed the first phase of robotizing stamping and die-forging. Our main plant has a robotized stamping and die-forging shop. Labor productivity has trebled. Robotized sections have been established also at three enterprises belonging to the association.

A new transfer line for the production of magnetic circuits is undergoing industrial testing. It has no equivalent abroad. All operations on it are performed automatically, from feeding the starting material to packaging the finished product. On the basis of this transfer line, we are planning to introduce the automatic production of magnetic circuits.

Work is underway on setting up a section for the automatic production of machining attachments (mandrels) using powder metallurgy and unmanned technology. One such section replaces 70 machine-tool operators. The first automatic module for making mandrels is already undergoing tests.

To raise the technological level of making windings, a line of machine tools has been developed and placed in operation, and the first section for automatic winding has been built. This has enabled us to fully automate winding in the manufacturing of a number of mass-produced products.

The development will be completed in 1985 of a flexible technological system for making the windings of complicated multiwinding transformers that will be produced in small series and a wide assortment. About 1000 parts with different standard ratings will be produced here. This flexible technological system will comprise 20 N/C machine tools, a conveyer with automatic addressing, and a control computer.

The automation of production is helping us to quickly master the production of new products, including very complicated ones. For example, our association has mastered within a short time the production of the first color video recorders.

Organization is enhancing the accelerated introduction of new technology at our association. The following diagram provides some idea of how we have organized the accelerated development and introduction of new technology. As evident from the diagram, the main feature of organization is that all work on automating a given section of production proceeds in parallel, whereby much time can be saved.

Ad hoc R&D teams and a special introduction service have become effective forms of accelerating the development and introduction of new technology at the Kompleks Production Association.

The ad hoc R&D team consists of workers on whom the project's success depends, regardless of which department's payroll they are on. From the earliest stages of development, therefore, all problems are solved comprehensively, be they design, technological or production problems.

### Ad Hoc R&D Team

(Designers, industrial engineers, production workers.) Organized to solve a specific task of introducing new technology.

Using PERT, performs following activities, as many of them concurrently as possible:

- Develops program to automate the new technology's calculations and layout;
- Selects available and develops own equipment, robots and control systems;
- Oversees production of the equipment, attachments and tools.

### Introduction Service

Includes specialists of the engineering services, adjusters, installers, operators of the new technology, and R&D team representatives.

Performs following activities in conjunction with developing and mastering the new technology:

- Trains personnel to operate the new technology in the early stages of development;
- Participates in developing new equipment and in building the experimental models;
- Installs, debugs, tests and places the new technology in operation.

Figure 1. Organization of the development and introduction of new technology at the Kompleks Production Association.

At the same time, it is possible to organize concurrently the activities in conjunction with introducing new technology. The acting out and selection of the optimal alternatives for the automatic systems' configuration, the classification of parts on the basis of technological similarity, and the development of the equipment, robots, attachments and tools are practically concurrent within the ad hoc R&D team. As a result, the entire cycle from the development to the production of the new technology is shortened.

The introduction service works in close contact with the ad hoc R&D team. One of its principal tasks is to train the personnel who will operate the new technology. The operation of complicated robotic systems, transfer lines and automated sections requires new knowledge and considerable specialized training.

If we start to provide such training only after the progressive technology has been installed, the time required to master it will be intolerably long.

Future operators of the new technology not only learn its theory, but they also participate in manufacturing, installing and debugging it. This saves labor. But, most importantly, this method allows the operating personnel to know the new technology thoroughly by the time of its startup, and thus they are able to immediately obtain a full return on the new technology.

The problems of organizing more efficiently the development and introduction of new technology and production's technological reequipment were discussed comprehensively at the scientific and practical conference held in Novgorod. The managers and specialists of the enterprises and associations in the oblast, and scientists of Novgorod Polytechnical Institute lectured on these problems. The following presented scientific papers: A. N. Lyusov, prorector of the Academy of the National Economy attached to the USSR Council of Ministers; Yu. V. Yakovets and G. N. Bobrovnikov, department chairmen; G. V. Badeyeva, chief of a scientific research laboratory; and D. M. Palterovich, senior scientific associate of the USSR Academy of Sciences Institute of Economics.

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## PRODUCT RENEWAL A REQUIREMENT OF OUR TIME

Moscow EKONOMICHESKAYA GAZETA in Russian No 30, Jul 84 p 14

[Article by P. M. Yudin, director general of the Volna Production Association, in the Library of Advanced Know-How section]

[Text] Today closed-circuit television is being used in practically every branch of the national economy. Therefore we are fully aware of the responsibility that we have been assigned for the technological level of our products and their constant renewal.

The association has prepared long-range plans for the acceleration of product renewal under the 11th Five-Year Plan, and a comprehensive target program for the 12th Five-Year Plan and through the year 2000. Annual comprehensive plans also are being prepared on the basis of the five-year plan.

Thus the 1984 plan calls for mastering the production of five new products, the certification of two products for higher quality, the recertification of two other products, the introduction and perfection of 70 technological processes, and other important measures.

Let us examine the process of product renewal on the example of closed-circuit TV equipment. We produced the first generation of industrial or institutional closed-circuit TV equipment designed with vacuum tubes, and eventually we replaced it with transistorized sets. In 1979, our association began to build third-generation closed-circuit TV equipment designed with widely used integrated circuits. Its reliability doubled, its size shrank to between one-half and one-third, power consumption dropped to between two-thirds and one-half, and the labor intensity of manufacturing the sets was reduced considerably. And now we are confronted with new tasks to solve the latest problems in television: x-ray and infrared television, TV automata for various applications, etc. have emerged.

As we very well know, a new product starts with an idea. Research and development lays the foundation for the new product's technological level and quality. It is impossible to obtain a high-quality product, even with the highest level of production, if the idea is bad and the design inefficient, or when the documentation is of poor quality and there are mistakes in research and development. At our association, therefore, it has become standard practice that both the developers and the manufacturers participate in the evaluation of a new

product's conceptual and detailed design before the R&D council, and in testing the experimental models.

We are assigning an important role to standardization and unification in the process of product renewal. Evaluation of the level of standardization and unification in the working drawings and specifications of third-generation equipment gave conformity coefficients of 85 percent for the assembly units in the sets, and 90 percent for the assembly units in the parts. These figures are significantly higher than the average for the industry. Thanks to this, development time was shortened considerably and more than 3.0 million rubles was saved merely in designing the Planeta system's products.

The developed equipment may be high-tech, but it can become obsolescent and lose its economic efficiency if the start of its production is delayed. To avoid this, we prepare production in detail concurrently with the development of new equipment, and at the same time we design and make the special attachments as well. This approach has enabled us to master the production of the same Planeta system's sets within a total time of only two years.

We are now working on the development of the Orbita fourth-generation industrial or institutional closed-circuit television system, the production of which we are planning to master completely in 1986. Besides having a wider range of potential applications, this equipment is more reliable and its power consumption has been reduced to between two-thirds and one-third.

The completion of research and development is scheduled for the fourth quarter of this year. However, the designers are ahead of schedule in designing two of the system's sets, and they have already transferred the documentation to production. Therefore we hope that our customers will receive the first lot of Orbita equipment even before 1986.

At the Volna Production Association, the basic directions in the accelerated mastering of the production of new products are as follows:

1. Modular principle in designing new systems of equipment.
2. Standardization and unification of the developed products.
3. Technological preparation of production in the early stages of R&D work.
4. Complete verification of the basic indicators of product quality (reliability and service life) on the experimental model.
5. Timely training of the personnel to produce the new product.

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## UPDATE AND IMPROVE USE OF EQUIPMENT AT TECHNICAL VUZ'S

Tallinn SOVETSKAYA ESTONIYA in Russian 15 Jul 84 p 2

Article by T. Lekhtla, candidate of technical sciences: "To Equipment through Equipment Must Lie the Path of Tomorrow's Engineer"

[Text] One of the basic tasks of a technical VUZ is to train specialists for dealing with equipment. During the study process the students already utilize various types of apparatus--laboratory stands, measuring devices, computers, etc. For future engineers this is both a source and a means of acquiring knowledge. Equipment will accompany them all their lives. But just how does it influence the formation of a future specialist?

The Tallinn Polytechnical Institute--Estonia's only technical VUZ--has come right up against the problems about which we will be speaking further. (By the way, they are also characteristic of other technical VUZ's, a fact which is testified to by the statements of many instructors both at personal meetings as well as at various conferences.) Students at the TPI [Tallinn Polytechnical Institute] are taught in 32 fields of specialization by more than 600 instructors, and far from all of them have a unanimous opinion on the role played by equipment within this process. However, the problems connected with its utilization are disturbing to many persons and, therefore, require discussion.

I have been personally moved to write this article by the introduction at the Department of Electric Drive of the following new field of specialization: "Systems of Programmed Control of Industrial Units and Robotic Complexes." This specialized field requires that the students study the most advanced equipment. For this purpose it became necessary to equip new laboratories, which also forced us to give more serious thought as to how and what kind of equipment is being used in the educational process. All the more so in that new disciplines are continuously being introduced at the VUZ, and the curricula of all fields of specialization are in the process of renovation. Thus, for example, about ten years ago we knew almost nothing about micro-processors, while today many courses are already being given on this subject in many departments. However, the laboratory base in connection with this has greatly lagged behind the requirements which have sprung up.

Often a dispute arises among the instructors as to whether or not it is possible in the educational process to utilize obsolete but still entirely operable apparatus, instruments, and calculating machines.

Some say--yes! As long as such apparatus is physically operable, as long as it performs its function, and as long as, with its help, we can demonstrate the validity of theoretical calculations, there is no sense in replacing it, and, furthermore, to do so would be economically unprofitable.

Others sharply retort--we've had enough of this junk! It's time to replace it with new equipment. Just look at what is happening: the students have begun wearing wristwatches that talk, and we show them a calculating machine operating on vacuum tubes. Just what kind of training are we offering here when they see up-to-date equipment primarily only on the covers of advertising brochures. (Here, by the way, we should seek out, in my opinion, the sources of an unhealthy worship of foreign equipment).

But who is right? It would seem that it is those who are for the most rapid possible renovation of the technical equipment. Upon closer analysis, however, it turns out that the answer here is not such a simple one. Of course, new equipment--and not just new but the newest--should be available to the students. It is also obvious that, under the conditions of the accelerating pace of its development, the frequent re-equipping of educational laboratories requires ever-greater material outlays. All the more so in that the equipment itself is constantly becoming more complex and more expensive. The acquisition by laboratories and departments of an increasing amount of custom-made equipment also confronts them with the complicated task of servicing this equipment. While previously one laboratory worker or engineer could cope with all the laboratory units within a department and guarantee their operability and readiness for use in the classes, today almost every custom-made unit (industrial robot, machine tool with numerical, programmed control, computer, etc.) requires a specially trained engineer to service it. Consequently, in order to ensure the training of engineers on an up-to-date level, we need not only more means but also more qualified specialists. It can be stated right off that the present-day situation--with its acute shortage of personnel in many sectors--does not facilitate this purpose.

There is also, however, another variant, which, while it does not completely solve, at least helps to solve, this problem: WE NEED TO DEVELOP MORE COOPERATION AMONG THE VUZ DEPARTMENTS, PARTICULARLY AMONG THOSE WHICH GRADUATE ENGINEERS IN CLOSELY RELATED FIELDS OF SPECIALIZATION. This would allow us to eliminate parallel equipment of laboratories which are essentially similar, to conserve resources by means of more intensive use of the equipment which we do have, and to ensure more qualified instruction.

But what is hindering the introduction of such cooperation? Most of all--it seems to me--certain outmoded traditions, which it is high time that we abandoned. It is a well-known fact, for example, that positions are distributed with regard to the departments according to the teaching load. Because of this, an unhealthy rivalry for teaching hours among the departments is frequently observed instead of cooperation. Cooperation is also hindered by the fact that, in order to teach students in closely related fields of specialization, use is frequently made of instructors drawn from the outside. In this situation, the departments often operate on the principle of "charity begins at home," and they care only about training in "their own" fields of specialization, showing little concern about the others. This, of course, does not work to the benefit of the common cause.

The VUZ is also greatly hindered at present by the traditional division between scientific-research and teaching work. They are joined only within the framework of the student scientific society and partially in the instructors' scientific-research projects which are funded by economic agreements and by allocations from the state budget. But in principle everything within them is divided--laboratory areas, equipment, etc. Frequently even the educational discipline which the instructor is teaching the students does not in any way coincide with the direction of his own scientific research. The interests of the teaching and scientific-research work are in contradiction. The departments must furnish 90 percent of their equipment for the teaching process by means of economic-agreement projects; moreover, funds are not allocated for it. But the lion's share of the funds from the economic agreements goes into the development of the scientific-research studies themselves. It is clear that the up-to-date equipping of teaching laboratories is achieved by the departments at the price of extraordinary efforts. Nor does this, of course, assist in any kind of forward movement.

The problems of utilizing custom-made technical equipment and the scientific potential in the educational process, in my opinion, have been successfully solved in the GDR at the Karl-Marx-Stadt Higher Technical School, with which our institute, and particularly the Department of Electric Drive, maintains close contacts. There a large, combined laboratory has been equipped for the students to study various types of electrical equipment. And scientific research is also conducted in this same laboratory. Placed herein are industrial robots, heavy-duty transformer units, various types of electric drives, which have been developed by the staff members of the school of electric motor vehicles and electric tractors, along with many other pieces of apparatus. The dimensions of this laboratory--approximately 2000 sq. meters--are unusual for us. A heavy-duty overhead crane under the ceiling gives you the impression that you have entered a plant workshop rather than the type of teaching laboratory which we are accustomed to.

Working in this laboratory are students and instructors in many fields of specialization; moreover, the specific, custom-made units and apparatus are serviced by engineers who are permanently attached to them. They also assist in conducting the educational classes and, in addition, carry out scientific research on these very same units.

Combining the activities of many departments in one laboratory also permits them to make better use of the instructors' scientific potential and to unite them for carrying out common scientific goals. The laboratory described here might seem to be a luxury, unacceptable for all technical VUZ's. However, the more effective utilization of the expensive equipment therein justifies, without a doubt, such an organization of this matter.

But what should we do with obsolete equipment? Can it still play some kind of useful role in the educational process, or should it be turned into utilizable waste?

Let's consider the following points here: while the teaching laboratories in the special disciplines indeed ought to be equipped with the most up-to-date apparatus, instruments, and installations so that the VUZ graduates may arrive on the job with a definite "reserve of firm knowledge" for the future, the

laboratories of a general-technical type have a different goal. Their duty is to provide the students with the fundamentals of technical thought, to show the process of the historical development of equipment, the struggle between opposing technical ideas, and the fate of certain inventions. A knowledge of the past is helpful in understanding what is going on in the present and in predicting the future, which is of no small importance for an engineering specialist. Consequently, obsolete equipment here should not be regarded as "junk," deserving only to be carted off to the dump. Specific old apparatus and units are representatives of a definite stage in the development of equipment; they embody the development of thought and the creativity of human hands. Therefore, we should regard old equipment with respect, and its place is far from simply on the dump (where some of it, of course, does wind up) or in a museum, but rather in educational laboratories. The latter could set up demonstration stands and exhibits of old apparatus and units reflecting the process of the development of equipment. Certain old aggregates and units can be actively used by the students. And the most up-to-date equipment should be placed along side the obsolete items without fail. This is necessary for purposes of comparison and, perhaps, even more for an understanding of the fact that the path to present-day equipment was laid through numerous barriers and difficulties, that the creation and introduction of something new always requires painstaking labor by the specialist. Or, as Karl Marx wisely declared: "there is no broad highway in science, and the only person who can reach its shining heights is one who, unafraid of fatigue, clammers over its rocky paths."

The technical units of educational laboratories are not only a source and a medium of knowledge. Laboratory equipment, its quality and technical level, the aesthetic form of the instruments and the apparatus, as well as the areas themselves--all of this constitutes important factors for educating the students' philosophical world view. It is not words, nor thought-up "educational" measures, but rather the specific educational and life environment which form a young person. Therefore, the technical equipment of VUZ laboratories must aim with all its capacity at achieving this goal.

2384

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## ACTIVITIES OF JUNIOR ACADEMY OF SCIENCES IN YAKUTSK OUTLINED

Moscow SOVETSKAYA ROSSIYA in Russian 2 Aug 84 p 1

[Letter from I. Cherskiy, doctor of technical sciences, professor, and president of the Junior Academy of Sciences, Yakutsk: "An Invitation...to Become Academicians"]

[Text] There are several dozen children in Yakutsk whom their peers call "academicians." This is not a humorous nickname: they wear their academic badges with pride, and each one can show a certificate in which it is stated that so-and-so is a full member of the Junior Academy of Sciences. And let nobody be confused by the word "junior," because, you know, the senior class members take part in serious research studies and in the solution of complex scientific problems.

This unusual academy had its birth a year ago. The initiators of its founding were the Council of Scientific Youth and the Komsomol Committee of the Yakutsk Affiliate of the Siberian Department of the USSR Academy of Sciences. The official status of the Junior Academy--or, to use its shortened form, the MAN--was approved by a special decree of the Presidium of the Yakutsk Affiliate of the Siberian Department of the USSR Academy of Sciences, the Yakutsk Gorkom Bureau of the All-Union Komsomol, the City Department of Public Education, and Yakutsk University. Thus, the MAN obtained the rights of citizenship, areas for its classes, scientific directors, and even their own estimate of expenditures.

The young scientists have set themselves a noble task: to develop among schoolchildren a creative attitude toward work and a love of independent research. A year has gone by, and the initial results can be summed up. The most important of these is, undoubtedly, the fact that most of the children have come to look differently at the surrounding world; they have attempted to define their own place in society and to find an answer to the very important question of who and what they should be.

I will not conceal the fact that we were unsuccessful in attracting all the students--during the initial period we were lacking in skills and experience. More than a third of those who began classes at the MAN dropped out. Some saw in the work of the Junior Academy merely its study aspect, although this, certainly could not be avoided. Some planned on using it as a unique kind of "tutor" for gaining admission to a VUZ. But we have other goals: any conversation with the children presents them with a specific task, which, in turn,

leads to a larger scientific problem.

At present the MAN has more than 70 pupils in Grades 8--10. Classes with them are conducted on a voluntary basis by specialists from the institutes of the Yakutsk Affiliate of the Siberian Department of the USSR Academy of Sciences, the university, the Pioneer Palace, and the Yakutsk Airport. The young academicians prepare summary reports on their research and sometimes surprise us by their originality.

Unfortunately, the Junior Academy also has its problems. The 1984 field-harvest period is at its peak, but the MAN pupils cannot take an active part. Some of the children are still under 16 years of age. It is sad for the "academicians," but the existing organizations have placed an insurmountable barrier in front of them. We consider that, for healthy, physically sound children, working out in the fresh air would not present any greater complications than their ordinary school practical work. The decree of the CPSU Central Committee and the USSR Council of Ministers, entitled "On Improving Labor Education, Instruction, and Vocational Guidance of School-Children and Organizing Their Socially Useful, Productive Labor," mentions the possibility of lowering the age limitations for allowing young persons to take part in independent work in a number of occupations. It seems to us that we ought to allow adolescents to work on field trips.

We have yet another "prosaic" problem--a financial one. After subscribing to the estimate of expenditures by the MAN, the directors of certain departments have "forgotten" to back up their paper promises with actual funds. But, of course, this academy does not spend very much--a few hundred rubles per year. The money goes primarily for creative study trips by the pupils--these are certainly not joyrides. They are very useful for the children. Just like adult scientific staff members, they report to their comrades by section, bring in informational materials, and propose new topics for research.

Although the schools are now having their summer holidays, at the Junior Academy life has not come to a standstill. Pupils of the Physics and Mathematics Department have made a visit to Novosibirsk--to a school for young programmers under the Siberian Department of the USSR Academy of Sciences; new letters will go out, addressed to the Junior Academies of Sciences in Kiev and Sevastopol', with which good contacts have been established. Laboratories of Yakutsk's institutes and the Botanical Garden have been opened up for the children. Under the guidance of scientists the young researchers thoroughly study the properties of substances, set up experiments, and observe the movement of the stars.

The MAN's charter, printed in typographical format, opens with the motto: "Labor, Thought, Daring, and Creativity--For You, Motherland!" And on the academy's emblem--an opened book--are a chemical flask, an atom, and a punched card. These are all symbols of science, whose tomorrow will also be defined by those who today are taking their first, so important steps into their professions, into creative work, and into a great, independent life. And I would like very much to see that no unnecessary obstacles are placed on this path.

2384

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REORGANIZATION OF GRADUATE STUDY IN SCIENCE DISCUSSED

Moscow LITERATURNAYA GAZETA in Russian No 31, 1 Aug 84 p 10

[Articles by the LITERATURNAYA GAZETA Science Department and Academician Vitaliy Lazarevich Ginzburg respectively: "Is It Necessary to Hinder Degree Candidates?" and "We'll Wait for the Results"]

[Text] /A letter from Academician V. Ginzburg was published in LITERATURNAYA GAZETA (No 10, 1984) in which several questions were posed on the training of scientific personnel. Today we call the readers' attention to a review of comments that were received, as well as the academician's commentaries./ [in boldface]

/Why does a doctor of sciences prefer to remain in the job of a junior research worker?/ [in boldface]

/Is it possible for someone who is competing for a science degree to discover a new long-range trend in his industry?/ [in boldface]

/Where and how are highly skilled personnel trained for science?/ [in boldface]

/To Some Degree--An Academic One/ [in boldface]

Why are dissertations written? Many readers considered it appropriate to ask this simple question in order to gain in the reply to it a foothold for further discussions. "If dissertations were necessary just for certifying research workers," reflects Doctor of Medical Sciences and Professor N. Kanshin (Moscow), "then it would be possible to support abolishing them and conclude the discussion on this point. However, real life shows that writing a dissertation is an extraordinarily effective stimulus for forcing one to do scientific research, because one needs only to welcome the 'overproduction' of candidates and doctors of sciences."

"However, it's necessary to recognize," objects Candidate of Technical Sciences and Docent A. Trushkevich (Minsk), "that the results of research presented for the defense [of one's dissertation] are far from being the same in scientific and practical value. Speaking with the language of economists, there are enormous reserves here. Somehow the situation has arisen that the fact of

writing and defending a dissertation proves to be more important at all levels of accountability than the essence of the matter: the degree candidate proposes what is new and useful." V. Alekseyev (Yakutsk) goes even farther in similar general conclusions: "If academic degrees were indeed really needed, then it would be necessary to confer them--without formalizing and defending dissertations--in accordance with the specific contribution of the scientific worker. The number of fortuitous people in science who have found a sinecure in it will be reduced with this procedure. A person who can do something ponderable and useful will also do this without a degree." Finally, Yu. Sedlov (Tambov) draws a firm conclusion on this score: "The whole system of conferring academic degrees and ranks is archaic. Is it impossible to manage in the bulk of cases as a whole without dissertations?"

/The readers tried to examine a paradoxical situation in the example of many occupations: a candidate or even a doctor of sciences copes with an assigned task worse than a worker who dreams about a dissertation and a degree, but who is conscientious, capable and energetic. For example, here's how this contradiction manifests itself in the pedagogical field. "It's a pity," relates A. Godzin (Vinnitsa), "when a certain degreed 'luminary of science', who mumbles and it's impossible to understand a single sentence, presents a lecture to students. And in another group, a teacher without a degree on the other hand explains with a talent something that is incomprehensible and difficult and makes it easily understood and interesting." Basing it on his own experience of many years, Candidate of Geological and Mineralogical Sciences A. Dobryanskiy (Donetsk) makes a precise differentiation of the "spheres of influence": "It's one thing to be a gifted lecturer and to present knowledge skillfully, and it's another to achieve these skills."/ [in boldface]

And nevertheless, as M. Tsupilov (Novocherkassk of Rostov Oblast) thinks, "To a certain degree, science is becoming littered with inferior but 'degreed' workers like a field with weeds among negligent kolkhoz workers." Along with many other readers he is of the opinion that "the academic councils, which for the time being aren't able to distinguish people who are talented and devoted to science from those who are degree competitors for their career or for the sake of prestige, are guilty of this."

/Bring Instructions Closer to Life/ [in boldface]

Quite a lot of unfavorable criticism is contained in the readers' comments on the procedure for conferring degrees and the work of VAK [Higher Academic Degree Certification Board]. P. Nikitin (Leningrad) complains: "It's such a pity that now a great deal of time and energy are being spent among scientific workers on filling out documents for dissertations and on performing a great number of formal requirements. There are scientific associates who have completed their dissertations and received good results, but who do not wish to defend them because the procedural aspects divert them for years from genuine and necessary work." One of the readers (who didn't sign the letter) sent to the editorial staff a list of the papers that it is necessary to present for defending a dissertation. Point after point--an entire page!--it requires certificates, agreements, testimonials, committee findings, and references that at times duplicate each other or are mutually exclusive in regards to the

point. Yu. Avdeyev (Rostov-na-Donu) writes: "Presenting a dissertation on paper with the wrong format or permitting several misprints in the text are sufficient not to receive an academic degree (even if you're Newton himself). And naturally the competitors waste their creative potential on various formalities. Wouldn't it be simpler to judge their work on the basis of its content?"

But then their difficulties, as do the criteria, also prove to be far from perfection. "During recent years," recalls Doctor of Juridical Sciences and Professor Yu. Kalmykov (Saratov), "I've had the occasion more than once to be a critic on doctoral dissertations, as well as a reviewer for VAK. And there hasn't been an instance where the opportunity occurred to qualify even outstanding work as research that contains a new direction in science. Usually one has to use an alternative version--the portion of a formula in which it speaks about solving an enormous scientific problem." Doctor of Biological Sciences S. Vasser (Kiev) also shares similar observations: "The poor scientific secretaries, chairmen and members of the special councils rack their brains over formulating conclusions on dissertations (I experienced this completely since I defended my dissertation after the new VAK instructions were put in effect) in order to somehow at least satisfy the unrealistic requirements. Don't instructions that are far from real life restrain the growth of scientific personnel?"

Several other opinions on this score are held by Ch. Andonovich and M. Shermenev (Moscow): "Ten years ago, following the reorganization of VAK, a great deal was done to increase the quality of dissertations. But now they're not operating with the innovation. Exacting requirements have become relaxed also on the part of the scientific councils where the defense occurs. While strictly observing the requirements of VAK, the scientific councils attempt to "adapt" and "fit" their own conclusions to them. The fact that instances of failure when defending dissertations is almost nonexistent is indicative of unnecessary liberalism. It's possible to eliminate these shortcomings just by means of strengthening the supervisory function of VAK."

#### /A Shortage or Surplus of Vacancies?/ [in boldface]

"One would think the subject of deserving employment of assistants and MNS [junior scientific associates] who have defended their doctoral dissertations would hardly be such a really sore one," declares Doctor of Chemical Sciences and Professor I. Gorelov [city of Kalinin]. "In any case, if such a problem exists, then it is a localized and purely metropolitan one. In my opinion, the shortage of doctors of sciences, which is being felt in a number of VUZ's in such large cities as Leningrad, Kiev and so forth, is of far more serious trouble. The rector of one of these VUZ's told me with chagrin: "Students study with us for five years and simply don't see a live professor." Doctor of Economic Sciences and Professor N. Raskov (Leningrad) confirms that a "shortage of doctors" with a surplus of vacancies for them exists in the city on the Neva, and he concludes: "It's necessary to avoid the obvious disproportions when the people at one location do not possess the proper skill for their work, while at another the highly skilled specialists are not engaged in their job."

In what manner can this be achieved? Doctor of Biological Sciences and Professor Ye. Logachev (Kemerovo) suggests: "Assistants and junior scientific associates must work on their dissertations, but not in order to remain in their previous position at a large scientific center, but rather to replenish the corps of scientists in Siberia, the Far East, Kazakhstan and other 'unsaturated' regions!" Professor V. Petlenko's (Leningrad) idea has a controversial ring: "In that instance when a certificate of availability of vacant positions where the competitors are working will be presented, or even when there is their consent to go where the ministry sends them, dissertations in competition for a doctor of sciences degree must be accepted for defense. As a matter of fact, don't we regulate the output of any product in a similar manner?" Candidate of Philological Sciences and Docent Ye. Miller (Ulyanovsk) gets into the argument: "Permit me to disagree with Academician V. Ginzburg's assertion that the tenure of a doctor of sciences in a junior scientific associate position is his personal business. It's true that the defense of dissertations must be free from obstacles of an administrative nature, but one can't go any farther without administrative intervention. It seems that the matter of the candidate's job allocation in the event of his successful defense is also resolved simultaneously with approval of the dissertation topic. This must be reflected in some kind of formal legal document, for example, in an appropriate USSR VAK statute."

/Candidate of Chemical Sciences and Docent V. Gruzdev (Ulyanovsk) adds: "An information service is needed on matters of where and what kinds of specialists are required. At best, only the local press reports on conducting competitive examinations for filling vacant positions." But these competitive examinations themselves, as an opportunity to distribute personnel more evenly, are placed under doubt in a series of letters. "They do not conform with the entire system for training personnel," thinks Doctor of Biological Sciences and Professor I. Borisov (Arkhangelsk). "A person becomes a specialist in one skill area, and in order to pass the competitive examination at another scientific institution he must learn anew what is disadvantageous in expenditures of both time and energies. It would seem that if specialists went into the "talent market" with desire, then why wouldn't there be plenty of them? But then why does each institution itself train the necessary specialists? And why does the VAK and not this institution resolve the matter of their suitability for a job? I don't see the grounds on which, let's say, an institute must be less free in personnel policy than a factory or a plant."/ [in boldface]

/Principle of Choice--An Unrestricted Competitive Examination/ [in boldface]

"In science, as nowhere else, it's important to have a reliable rising generation," notes Doctor of Biological Sciences and Professor V. Yablonskiy (Kamenets-Podolskiy). "Today, however, it's not easy to pick out capable young people. Recently, the competitive examination for graduate study has fallen sharply, and at times it simply doesn't take place." And Professor S. Stetskevich (Leningrad) acknowledges: "We accept so-called 'special students' about whom we know very little and we judge them solely according to their exam results and the papers that are turned in, whereas we can't accept our own

students who prove themselves to be very good and who are obviously gifted for scientific work. Apparently, as Academician Ginzburg proposes, it's necessary to restore the unrestricted examination."

The authors of a collective letter--Doctor of Geological Mineralogical Sciences N. Frolov, Candidate of Technical Sciences V. Dubinchuk and Graduate Student G. Denisenko (the settlement of Zelenyy in Moscow Oblast) also perceive the main shortcoming of present graduate study to be in the severity of its planning: "The number of spaces for graduate study, irrespective of the number of aspirants, is 'falling' and fortuitous people frequently find themselves in this number. They're simply obliged to become candidates of sciences, or else the plan won't be fulfilled. The scientific administrator will be punished: some other time he won't be given graduate students in whom he has a direct interest, since the rank of professor is conferred irrespective of the number of those who are defending their dissertations."

"Wouldn't it be better," asks T. Kareva (Kiev), "to accept for graduate study only those who have worked for awhile and have proven themselves in one branch of knowledge or another? Or as sometimes still occurs, people enter graduate study who aren't interested in science and don't have the ability to study it. The state pays for two years of their 'labor' which amounts to searching for a dissertation topic." Candidate of Physical Mathematical Sciences and Docent S. Kontush (Odessa) sets his hopes on this kind of procedure: "It's possible that it's necessary to impose upon associates of the NII [scientific research institutes] (at a rank no lower than doctor of sciences) the duty of 'locally' seeking out graduate students for themselves and watching over them until a successful defense of their dissertations." Doctor of Chemical Sciences O. Okhlobystin (city of Ordzhonikidze, North Ossetian ASSR) flatly disagrees with this: "Too often the interrelations of VUZ's in the outlying districts with the central and academic institutions are formed in accordance with a diagram: the VUZ supplies the 'manpower' and in return it receives the right to participation in publishing and, it must be confessed, even in writing doctoral dissertations." Medical institute instructor V. Bakhmut (Kursk) argues: "Academician Ginzburg is correct in saying that a proper atmosphere is necessary for training a highly skilled scientist. So, the outlying scientific and pedagogical districts need their own leaders and prominent scientists who would surround themselves with capable people and create their own schools." Professor V. Udom (Tselinograd) objects to eliminating graduate study "where there are comparatively few highly skilled specialists." You see, then the "distortion" is just aggravated.

Corresponding Member of the Kazakh SSR Academy of Sciences, Doctor of Philosophical Sciences, and Professor A. Kasymzhanov (Alma Ata) also upholds the right to "local initiative": "Although in a number of disciplines it's advisable to concentrate training of the rising scientific generation precisely in the USSR Academy of Sciences institutes, nevertheless measures also are necessary for decentralizing graduate study. Expanding it in the republic academies and VUZ's will make it possible to embrace as much as possible the long-range trends for developing science and to satisfy 'local' requirements for skilled specialists of a necessary specialization." The majority of the readers who

made comments share the opinion that future scientists must enter graduate study not just according to specific trends and that the rising scientific generation must be trained not just in academic institutions.

/LITERATURNAYA GAZETA Science Department/ [in boldface]

When I saw the comments on the article "Is It Necessary to Hinder Degree Candidates?", I recalled the well-known aphorism of Koz'ma Prutkov: "It's impossible to comprehend the incomprehensible." It's true, nevertheless, that it's possible to comprehend the range of questions associated with dissertations, but it infringes upon the interests of many people and society as a whole. Therefore it's impossible to hope to cover an entire problem, and all the more to resolve it, in a newspaper article or even in a whole discussion. I believe, however, in the usefulness of open discussion and in the power of public opinion. The discussion in the newspaper, which was reinforced by discussion "locally", should yield its own fruits and, in particular, it should promote the solution of a number of problems which are not really so complex, but nevertheless have been around for years without attention. In this connection, I want to make several more observations and to explain that which remains insufficiently clear from my previous article. In this regard, I'll attempt also to respond to several readers' letters.

Of course, training and the defense of dissertations are not ends in themselves. This is just a method for increasing the qualifications and certification of scientific workers and, moreover, the method is far from being ideal. However, world practice doesn't know the best method and attempts that were undertaken in the past in our country to abandon defending dissertations and conferring academic degrees have not brought success. Thus, the question must just concern perfecting the system and eliminating the shortcomings. In this regard, as it seems to me, it's impossible to approach different specialties with identical measures. More than once I've had to hear about the great successes of engineers and agronomists who have no degrees at all. Recently in my own experience, and which was extremely unpleasant as well, I was in a position to be convinced of how much more successfully a physician without any degrees can assist in comparison with a doctor of medical sciences. What I've said is by no means an attack on engineers, agronomists and medical personnel with scientific degrees, but rather a statement of the particularly great role of experience, intuition, organizational abilities and so forth in a number of areas. On the contrary, in natural science--a specifically in physical mathematical sciences--a scientific degree or academic rank, which has been received deservedly, is usually indicative of high qualifications in a sufficiently broad area, and they make it possible to count on obtaining valuable advice and assistance from a given person in resolving a number of tasks and so forth. But here also it's necessary to make a reservation that concerns teaching: while not really speaking about talent, it's possible to be a very profound researcher, but not to possess teaching abilities. There's no doubt that it's useful in VUZ's to have just a few more doctors of sciences, and even ones without teaching abilities (even if it suffices to recall the scientific work that is conducted in VUZ's). However, at least I consider it an open question of who is more valuable for a given VUZ--a doctor of sciences, or even an

academician, who doesn't know how to teach or a skilled docent with obvious teaching abilities (this pertains particularly to teaching in minor courses).

/What follows from all of this? Just the fact that it isn't necessary to make a fetish of defending dissertations, scientific degrees and scientific ranks. I'm really not speaking about the fact that "bearers" of these degrees and ranks have no right whatever to disturb the generally accepted norms of behavior. On the other hand, there are no grounds to generalize about individual cases of conferring undeserved degrees and other negative occurrences, as well as to perceive one's striving to defend a dissertation as something improper. As a rule, people prepare dissertations who are honest and devoted to science, who deservedly receive degrees, and then who are of appropriate benefit to society./ [in boldface]

A lot of letters in particular contain a criticism of VAK. I haven't participated whatsoever in VAK's work and I'm familiar with its activities only as a member of one specialized council on conferring scientific degrees and, as they say, from private reports. Therefore I'll confine myself to a few observations. A long list of papers and bits of paper that are necessary for defending a dissertation, and which was sent by one of the readers, is simply depressing. One has to spend too much time and energy on assembling these papers and the entire defense.

As regards the quotation that was cited in my previous article from the instructions of VAK, where the requirements for doctoral dissertations were formulated, I'll add the following. Annually, more than 2,000 doctoral dissertations are defended throughout the country. Thus, can one imagine what is involved here even if in half of the cases "scientific statutes were formulated and substantiated, and the sum total of which one can qualify as a new long-range trend in an appropriate branch of science"? In practice, it's well-known what constitutes a good, full-fledged doctoral dissertation and the specialized councils also are guided by this. It's advisable also to bring the instructions into greater conformity with real life. At the same time, it's necessary to emphasize that the excessive demands don't fill them with a certain anxiety so much as the cases that are encountered of defending insufficiently valuable dissertations.

VAK's activities are highly complex, but also necessary. So then what is desired is an improvement in its operation. The critical observations that were received at the LITERATURNAYA GAZETA editorial office must promote this.

It was emphasized in the letters of a number of readers that the "satiation" with doctors of sciences pertains only to a few academic institutes in Moscow and therefore no real problem whatsoever on a "national scale" has occurred here. I can't agree with an opinion like that. The more candidates and doctors of sciences there are in a given institute or city the more of them, generally speaking, that appear once again in this institute or city. A sufficiently intelligible law is like that (it is called the exponential law of growth in a somewhat more generalized form). Therefore, under conditions when there aren't enough doctors of sciences across the country as a whole, as is emphasized in a number of letters, it is intolerable to hinder in some way the

defense of doctoral dissertations wherever that may be. I won't repeat the other arguments that were cited in the previous article. In short, the appearance of new candidates and doctors of sciences (of course, who fully deserve these degrees) is always useful. Hindering the defense of dissertations under the pretense that there are no suitable vacancies and so forth in a given institution means to show a typical "order of seniority."

/The genuine problem occurs because a considerable portion of those who defend doctoral dissertations don't want to leave their scientific institute or VUZ, even while remaining in the position of junior scientific associates or assistants. They act this way not from the good life. Either they're hoping to obtain a suitable position in the future at their very own institution or, even while not hoping for this for a number of reasons (family situation, state of health and so forth), all the same they don't bring themselves to leaving for another city in order to occupy a vacant chair. Of course, it's impossible to consider a situation such as this as normal, but by no means does the way out consist of hindering the defense of dissertations and requiring the resignation from an institute or VUZ of doctors who have not been provided with positions that are appropriate for their skills./ [in boldface]

I'll not undertake to propose the ideal solution. But there's a great deal that can be done. First of all, as far as I know, right now sufficiently widespread information on available vacancies is in total disarray and, generally speaking, nobody is worried about the "employment" (it's difficult to manage here without quotation marks) of doctors of sciences in a centralized and systematic manner. VAK could take these functions upon itself. Secondly, it's necessary to take into consideration the reality and usually valid unwillingness of people to break once and for all with the capital cities. Therefore it's advisable to allow professors to occupy a position in a VUZ in the outlying districts, while not moving there for good but coming for a while during a term of no less than 5 years. Inasmuch as a proposal of this kind probably also will encounter a negative attitude, I'll allude to the fact that I'm well aware of quite a few cases when a similar practice yielded quite positive results. In particular, for many years after 1945 I myself was a professor at Gorkiy University holding more than one office. I organized a department there which, of course, is active now, but long ago I lost count of the doctors and candidates of sciences from among their number who have graduated from this department. There are already enough skilled people in our country right now to implement the practice of holding more than one pedagogical office in other cities, but I think it's quite reasonable and advisable to give professors the opportunity to work temporarily in the outlying districts. Thirdly and finally, it's necessary to introduce the position of scientific associate (apart from the existing positions of senior and junior scientific associates) as well as to implement a number of other organizational and financial measures with a view towards eliminating the difficulties that arise with the "overproduction" of doctors and candidates of sciences.

Going through graduate study is a valuable and sufficiently verified method for achieving high skills in the area of physical mathematical sciences and in all the natural sciences as a whole. If it doesn't concern people who are very gifted and, in addition, those who also have been developed (it's impossible to

place the equals sign here) early during the student years, it's still impossible to achieve appreciable scientific results and to mature fully in a scientific respect. On the other hand, a great deal has already been laid for this at the VUZ and, as a rule, a break for several years leads to extremely negative results. Precisely therefore, they're accepting students for graduate study in the mentioned specialties immediately following the VUZ. Graduate study like this is in some measure an extension of instruction at a VUZ, but under other conditions and with the accent on scientific work. If one doesn't speak about the exceptions again, then a scientific environment and the opportunity for broad discussions and contacts with specialists are necessary, and a good library (particularly one having recent foreign periodicals and books) is essential for successful instruction in graduate study. Meanwhile, and even in Moscow and in academic institutes as well, we're experiencing difficulties right now with obtaining all the necessary foreign literature and information. Further, as I have written already, there are relatively few graduate students at the USSR Academy of Sciences where they nevertheless have the best conditions, and they're being trained just "for themselves." I consider a situation like this simply absurd. Precisely therefore, academic graduate study also should be reorganized. The question doesn't concern "taking" people away from the outlying districts, while bleeding the VUZ's and NII's there (as several readers fear), but something entirely different. In fact, allocation for a job occurs following graduation from an institute, so why is it impossible to implement an allocation like this too following completion of graduate study?

/In short, it's necessary to let all VUZ graduates in some specialties (let's say, to begin with, in physics and mathematics) to enter an open competitive examination for graduate study at the USSR Academy of Sciences in Moscow. And perhaps in Leningrad too. It's possible also to organize this graduate study jointly with the major VUZ's (MGU [Moscow State University imeni M. V. Lomonosov], MFTI [Moscow Physical Technical Institute], and LGU [Leningrad State University imeni A. A. Zhdanov]). Those who have completed this kind of graduate study in their own majority can return to the same VUZ where they studied. This is as though it's close to special-purpose graduate study, but with a vast and fundamental difference: an open competitive examination and the selection of people who are the most occupationally suitable./ [in boldface]

It is reported in the letter of Deputy Chairman of the USSR State Committee for Science and Technology V. M. Kudinov, which was published in LITERATURNAYA GAZETA (No 26, 1984), that the proposal on organizing graduate study of this type will be considered (I also forwarded appropriate proposals to the USSR State Committee for Science and Technology and to the USSR Academy of Sciences). Therefore, there are no grounds to develop this subject right now, so we'll wait for the results.

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## IMPROVED CONTACTS AMONG ECONOMISTS URGED

Tallinn SOVETSKAYA ESTONIYA in Russian 13 Jul 84 p 2

*(Article by V. Rayanyan, deputy chief, Science and Educational Institutions Department, CP of Estonia Central Committee, candidate of economic sciences: "Contacts Are Not a Goal but a Means")*

*(Text)* This republic's scientists must be more bold in posing and solving the new problems being set forth by life, and they must do this actively and creatively--such was the assertion in the article entitled "What Kind of Economists Does Economics Need?" (SOVETSKAYA ESTONIYA, 27 April 1984).

However, success is possible only if there are business-type contacts among the researchers themselves who are engaged in studying a common problem. This is the topic of today's article.

One out of every ten scientific workers in our republic is employed in the sphere of economic science; one out of every seventeen doctors of sciences and one out of every ten candidates has an academic degree in economics. It is difficult to over-estimate the importance of close working contacts among these forces. And, indeed, where such contacts do exist, the results are clearly visible.

One of the most voluminous of these, combining the labor of many groups, was working out the PROGRAM FOR THE ESTONIAN SSR'S SCIENTIFIC AND TECHNICAL PROGRESS, which has been included in the analogous, comprehensive program for the entire USSR for the years 1986--2005. Together with scientists from the Economics Institute of the EsSSR Academy of Sciences, staff members of the following organizations worked on compiling it: the Economics Department of the Tallinn Polytechnical Institute, the Estonian Affiliate of the All-Union Scientific Research Institute for Studying Public Demand for Consumer Goods and Business Conditions for Commodities under the USSR Ministry of Trade, the Estonian Scientific Research Institute for Scientific and Technical Information and Technical-Economic Research, as well as other institutions which are engaged in the study of technical or sectorial problems, for example, the institutes of cybernetics, thermophysics, and electron physics under the EsSSR Academy of Sciences, the institutes of forestry and environmental protection under the republic's Ministry of Forestry and Environmental Protection, and the institute for construction under EsSSR Gosstroy. Implementation of this large-scale project, which

was participated in by a total of more than 150 republic-level ministries, departments, scientific institutions, planning organizations and enterprises, was also included within the socialist pledges of this republic's working people for the year 1983. The pledge was fulfilled ahead of schedule: in April of last year the results of the project were transmitted to the USSR Academy of Sciences and to other concerned organizations for further utilization.

The directorial organs have made provisions so that, every five years, the comprehensive program for scientific and technical progress, designed for 20 years, is to be refined, and, taking this into account, its next phase would be drawn up for the new five-year plan. And so, the experience accumulated in carrying out such joint projects in the republic will also be suitable in the future. At the present time, under the aegis of the Economics Institute of the EsSSR Academy of Sciences, work has already begun on refining the methodology for the new phase of the comprehensive program.

Likewise extremely important for the national economy is the participation by economic scientists in conducting research in the field of equipment and technology so as to provide timely economic evaluation for new engineering solutions and help in selecting the best variants. We also have examples of this: the Economics Institute of the EsSSR Academy of Sciences and the Economics Department of the TPI [Tallinn Polytechnical Institute] took part in working out a targeted, comprehensive program for over-all machine-building production.

All the major problems, no matter how many there are, of increasing the effectiveness of the economy are jointly resolved these days by large groups. The work of most of our economists is combined under the program entitled "Forecasting and Planning the Economic and Social Development of the Estonian SSR," being carried out under the direction of Academician of the EsSSR Academy of Sciences A. Keyerna. Along with this, our scientists also take part in implementing a number of All-Union programs and coordinated plans. For example, an economics research group at the higher school of the TPI (where the author worked for a number of years and with which he has maintained close contact up to the present time) has been studying the problems of utilizing personnel, based on the criterion of their education and determination of the requirements and prospects for their training. This work, which is a component of republic-level programs, has also been included in the scientific-coordination plan of the CEMA member countries with regard to the corresponding problems; it is also a part of the All-Union coordination plans of the USSR Ministry of Higher and Secondary Specialized Education.

As we have seen, there are many coordination plans with regard to the economy. But the coordination itself, unfortunately, is not always conducted on the required level. At times the information about what has been accomplished, which is presented annually by the various institutions to the chief organization, sits there almost without being analyzed or summed up, and, for this reason, does not engender any conclusions which might be of service to the cause. For example, with regard to the problem of effectiveness in utilizing labor resources (on which our economists likewise are working), the Leningrad Finance-Economics Institute as the chief organization annually conducts coordination conferences. However, no summarizing conclusions or proposals based upon an analysis of the materials at these conferences have yet been made. Thus, timely

research studies have no feedback and fail to provide the effect which they could.

Quite a few joint projects are carried out by economists at VUZ departments and laboratories, as well as at scientific research institutes, based on the principles of economic agreements. The Economics Department of the TPI, for example, has economic agreements with Estonglaveenergo [EsSSR Main Administration of Power and Electrification], with the Scientific Research Institute for Economics and Planning of EsSSR Gosplan, etc. There is also another form of joint project--without financial relations--let's say, within the framework of an agreement on socialist cooperation. The chairs and laboratories of this same department of the TPI have, for example, such agreements with the EsSSR Ministry of Local Industry and with the Tallinn Gorispolkom.

Our economists' ties are not exhausted merely by agreements within this republic; they are considerably broader and extend to such institutions as the Economics Institute of the USSR Academy of Sciences, the MGU [Moscow State University], the International Scientific Research Institute on Administrative Problems in Moscow, the Sociological Research Institute, the Central Scientific Research Institute on Domestic Services. They jointly publish works, conduct conferences, give lectures, and hold consultations. The TPI's Statistics Department has already compiled the eighth and ninth issues of collected works with the participation of authors from various VUZ's and scientific institutions. In Moscow, under the editorship of USSR Academy of Sciences Academician D. Khachaturov, a work has been published with the title "Economic Problems of Using the Country's Investment Potential during the Period of Developed Socialism"; among its authors is G. Kirillova from the Economics Institute of the EsSSR Academy of Sciences. Among the authors of another solid collection, "Modeling Regional and Sectorial Proportions within a System of Optimal Prospective Planning," is another staff member of this institute, Yu, Kakhi. And so forth.

Our scientists' broad contacts are also testified to by the fact that every year in this republic a number of All-Union and international conferences are held, including some on economic problems. Every two years (the last time was in Tallinn) witnesses the holding of an inter-republic theoretical seminar on the problems of planning and administering economic systems, with the participation of scientists from the Economics Institute of the EsSSR Academy of Sciences, the Central Economics and Mathematics Institute in Moscow, and the Economics and Organization of Industrial Production Institute of the Siberian Department of the USSR Academy of Sciences. A meeting between economists from the GDR and the USSR also took place in Tallinn.

Within the republic itself yet another form of contacts has begun to appear--the sectorial institutes sometimes hold joint party meetings with Communists from the apparatus of the higher-ranking ministry. Such a practice can clearly speed up the cause and expand it in a coordinated manner in the future.

Drawing economists--scholars and practical workers in the field--closer together has also been facilitated by the republic-level organization of the All-Union Scientific Economics Society, which was founded two years ago. Although it is still in the emerging stage, many of its primary organizations have already gathered strength. Recently in April the first annual conference was held on

improving planning and the management mechanism. All-Union renown has been achieved by the young scientists' club operating within the framework of this society; its initiators are energetic researchers, distinguished by their business-like quality, as, by the way, is likewise the entire younger generation of this republic's economists. Just this past May they held already their sixth republic-level scientific seminar. These measures are important for expanding the horizons of the young scientists; they receive the opportunity to deliver reports and set forth their own theses. Inasmuch as the discussions sometimes become quite sharp, every speaker must prepare for them seriously. As a result, new ideas are given birth, which may subsequently be reflected in scientific reports and dissertations.

Nevertheless, in certain scientific institutions people still underestimate the participation of young persons in such seminars. They consider that the topics of the studies are too broad. But they are intentionally such--in order to encompass the maximum number of young scientists, so that each of them can make his own contribution to solving the problems under consideration. Regularly taking part in such seminars are scientists from the Economics Institute, the Scientific Research Institute of EsSSR Gosplan, the Information Institute, and young persons form the economics departments of the VUZ's. But economists from other institutes and institutions attend them either on an irregular basis or else not at all. It is obvious that the work of the councils of young scientists here is still not up to the level it should be.

And so, fruitful contacts among economists are developing and are taking on ever-newer forms. And it is important now not to increase the number of measures but to use to the maximum all opportunities for joint work as a means of achieving the greatest possible results. And it is at this that we need to direct our efforts. A "personal" analysis has shown that even in places where contacts have been well-arranged on the whole, a portion of the scientists remain on the sidelines without participating. But if a scientist has not appeared at a single scientific conference for several years, if he cannot say anything new to his colleagues, then the question arises as to whether he is engaging in scientific activity at all. In institutions where research on economics is conducted there should be an average of one or two publications year on a average per scientist. Moreover, for some staff members the number of publications exceeds ten, while others do not publish even once during the course of the year. The directors of the sectors, departments, and institutes, as well as their party organizations, must analyze the quality of the work of each scientists personally so as to see to it that there are no passive persons in science.

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CSO: 1814/211

UDC: 578/.579+612.017.1]:92 Yakovlev

AVENIR MIKHAYLOVICH YAKOVLEV CELEBRATES HIS 60TH BIRTHDAY

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 3, Mar 84 p 121

[Text] August 1983 marked the 60th birthday of Professor Avenir Mikhaylovich Yakovlev, chief of Department of Microbiology, Virology and Immunology at the Leningrad Pediatric Medical Institute, who is one of the well-known Soviet microbiologists.

Having graduated with honors from secondary school in Leningrad, in 1941, A. M. Yakovlev enrolled in the Military Medical Academy imeni S. M. Kirov. After the academy was evacuated from the invaded city, he took a shortened course of feldsher training, and was sent to the front in August 1943. As feldsher in the 1st Motorized Rifle Battalion and then in a mortar battalion of the 7th Guard Mechanized Brigade of the glorious 3d Guard Mechanized Corps of Stalingrad, he participated in combat operations on the 2d Ukrainian, 3d Belorussian, 1st and 2d Baltic fronts, and in 1945 he participated in the war with imperialistic Japan and in the liberation of North Korea. In 1947, Avenir Mikhaylovich returned to finish his education at the Military Medical Academy imeni S. M. Kirov, from which he graduated in 1953. He then served in the army as senior physician of a motorized rifle regiment.

While still a student at the academy, A. M. Yakovlev displayed interest in research in the area of microbiology, mastered many microbiological techniques and conducted independent investigations dealing with antigen competition. In 1955, as a result of winning a competition, he was accepted for graduate studies in the academy's department of microbiology. In 1958 he defended his candidatorial dissertation and in 1967, doctoral. During all these years, this scientist did much pedagogic and scientific research work, holding the jobs of scientific associate, junior instructor, instructor and senior instructor in the department of microbiology at the academy. In January 1974, he was appointed chief of the department of microbiology at Leningrad Pediatric Medical Institute. He received the title of professor in 1975.

The first investigations of A. M. Yakovlev dealt with antitoxic immunity; then he worked for a long time on problems of suppurative-septic infection, conducted a fundamental investigation in the area of microbiology and immunology of burn disease. He devotes much attention to development of modern clinical microbiology and immunology, stimulating for this purpose joint research with clinical

departments. He and his coworkers conducted several original studies in this direction, dealing with immunology of suppurative-septic infections in children, microbiological and immunological characteristics of premature babies, non-specific resistance of infants with staphylococcal skin lesions, immunological changes associated with thyroid pathology, lung diseases, etc. He has authored more than 110 scientific works. At the present time, the team he heads is concerned with investigation of immunology of children under normal and pathological conditions, and immunological aspects of extreme states.

A. M. Yakovlev is a gifted pedagogue and educator. His students work at many scientific and educational establishments of the USSR and abroad. For his successful training of young scientists, he was awarded the diploma of the USSR minister of higher and secondary specialized education. Prof A. M. Yakovlev is performing much fruitful pedagogic work in the department for advanced training. His lectures are enjoyed by the audience. He devotes much attention to methodological work, being deputy chairman of the institute's methodological council and chairman of the educational-methodological commission of the Leningrad Society of Epidemiologists, Microbiologists and Parasitologists.

A veteran of the war, member of the CPSU and colonel in the medical service, he has received two orders of the Red Star, Medal for Valor and 13 other medals.

Avenir Mikhaylovich is celebrating his 60th birthday at the height of his creative force and energy. His coworkers and students wish him health and further achievements in his scientific and pedagogic endeavors.

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CSO: 1814/203

UDC: 616.9-036.2+612.017.1]:92 Morgunov

**IGOR' NIKOLAYEVICH MORGUNOV CELEBRATES HIS 70TH BIRTHDAY**

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 3, Mar 84, p 120

[Text] Professor Igor' Nikolayevich Morgunov, doctor of biological sciences, chief of the Department of Epidemiology at Kiev Medical Institute imeni Academician A. A. Bogomolets, was 70 years old on 20 October 1983, which marked 47 years of his scientific, pedagogic and public endeavors.

After graduating from Dnepropetrovsk Medical Institute in 1936, Igor' Nikolayevich worked as scientific associate in the Epidemiology Department of the Dnepropetrovsk Sanitary and Bacteriological Institute. During the years of the Great Patriotic War, he was sent by the USSR People's Commissariat of Health to Irkutsk Institute of Epidemiology and Microbiology, where he headed first the epidemiological and then the microbiological department. At this institute, he organized a laboratory of wound infections, in which research was conducted and tetanus and gangrene sera were produced for hospitals on the front and in the rear.

In 1944, I. N. Morgunov returned to the Dnepropetrovsk Scientific Research Institute of Epidemiology and Microbiology, defended his candidatorial dissertation, and soon became deputy director for production of bacterials, then deputy director for research. He has been a member of the CPSU since 1945.

In 1949, I. G. Morgunov transferred to the Kiev Scientific Research Institute of Epidemiology and Microbiology where he headed the Immunology Laboratory and was deputy director for research. He was chief epidemiologist of the Ukrainian Ministry of Health for several years.

In 1959 he defended his doctoral dissertation.

In 1961, I. N. Morgunov was elected to the position of professor and in 1952, as chief of the Department of Epidemiology at Kiev Medical Institute. Continuing and developing the ideas of L. V. Gromashevskiy, he made a great contribution to refinement of educational-methodological and research work in the department. Igor' Nikolayevich generously passes on to students and physicians his rich theoretical and practical knowhow. His lectures are always outstanding for logical continuity, high scientific level, and received with interest by his audience. Under his supervision, 9 doctoral and 25 candidatorial dissertations were prepared. He has authored 184 scientific works,

including 3 monographs. He worked much on problems of epidemiology of infections caused by conditionally pathogenic pathogens; he constantly helped clinical public health in organizing and implementing epidemic-control and preventive measures. Several methodological recommendations on prevention of infectious diseases were published under his guidance.

Along with much educational-methodological and research work, I. N. Morgunov is active in public work, being a member of the office of the Presidium of the Republic Scientific Society of Epidemiologists, Microbiologists and Parasitologists, chairman of the Immunology Section of this society, member of the republic's Immunology and Allergy Problem Commission and member of the plenum of the scientific council of the Ukrainian Ministry of Health. He was awarded the Badge of Honor and several medals for his achievements.

We wish him good health and further success in his endeavors.

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UDC: 616.9-036.2:92 Skvortsov

VITALIY VASIL'YEVICH SKVORTSOV CELEBRATES HIS 80TH BIRTHDAY

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 4,  
Apr 84 p 120

[Text] Vitaliy Vasil'yevich Skvortsov, doctor of medical sciences, professor, and retired colonel of the medical service has celebrated his 80th birthday and 64th year of work.

V. V. Skvortsov was born on 16 (29) January 1904. He received his higher medical education in Leningrad, then served as troop physician in engineering units (chasti), epidemiologist in a sanitary and epidemiological laboratory and sanitary-epidemiological detachments, and chief of a sanitary and epidemiological detachment in the Central Asian Military District. He started working in the Sanitary [Health] Administration of the Red Army in 1938 as assistant to the chief of the sanitary and epidemiological department and, starting in 1944 as chief of the sanitary and hygienic department of the Main Military Medical Administration. He displayed his qualities as a gifted organizer and researcher in this period. There were no major outbreaks of infectious diseases in the Soviet Army during the years of the Great Patriotic War largely due to the fruitful endeavors of the sanitary and hygienic department.

From 1949 to 1955, V. V. Skvortsov was chief editor of VOYENNO-MEDITSINSKIY ZHURNAL [Military Medical Journal]. He made a large contribution to advancement of its ideological and theoretical standards and practical relevance. From 1955 to 1970, Vitaliy Vasil'yevich was chief epidemiologist of the RSFSR Ministry of Health and concurrently he was head of the department of epidemiology at the Second Moscow Medical Institute imeni N. I. Pirogov (up to 1976). Subsequently, he was a consulting professor (up to September 1983).

The scientific endeavors of V. V. Skvortsov were multifaceted. In 1944 he defended his candidatorial dissertation and in 1955, doctoral. In 1957, the scientific title of professor was conferred upon Vitaliy Vasil'yevich. He worked in expert commissions of VAK [High Degree Commission?].

The scientific works of V. V. Skvortsov shed light on problems of upgrading sanitary-hygienic and epidemic-control support of the troops, prevention and control of infectious diseases, organization of work of epidemic-control institutions. In all, he published more than 100 scientific and popular-science works, including chapters in cooperative monographs, textbooks and manuals. A total of 15 candidatorial dissertations were prepared under the guidance of V. V. Skvortsov.

Vitaliy Vasil'yevich is active in scientific and public work. He has been the deputy chairman of the board of the All-Russian Scientific Society of Epidemiologists, Microbiologists and Infectious Disease Specialists, and chairman of the board of the All-Russian Scientific Society of Epidemiologists and Microbiologists since 1977. V. V. Skvortsov has participated in many scientific congresses and conferences held both in our country and abroad. For a long time he was member of the editorial boards of VOYENNO-MEDITSINSKIY ZHURNAL [Military Medical Journal] (VOYENNO-SANITARNOYE DELO [Military Health Record] up to 1944) and SOVETSKAYA MEDITSINA [Soviet Medicine]. At the present time, Vitaliy Vasil'yevich is a member of the editorial council of ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII.

V. V. Skvortsov is the recipient of orders of Lenin, October Revolution, Red Banner, two Red Star orders and 11 medals, including the one for Combat Achievements.

The All-Russian Society of Epidemiologists and Microbiologists, the editorial boards and offices of ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII and VOYENNO-MEDITSINSKIY ZHURNAL cordially congratulate Vitaliy Vasil'yevich Skvortsov on his birthday and wish him good health and new creative achievements.

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UDC: 616-036.2:92 Polyakov

#### OBITUARY OF YEVGENIY MAKSIMOVICH POLYAKOV

Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 8, Aug 84 p 120

[Text] The well-known epidemiologist, major organizer of public health and doctor of medical sciences, Prof Yevgeniy Maksimovich Polyakov passed away on 7 January 1984.

Ye. M. Polyakov was born in 1916 in the city of Aleksandriya, Kirovograd Oblast, to a family of teachers. He started to work in 1935, after graduating from the Kremenchug Railroad Tekhnikum. In 1938, Yevgeniy Maksimovich enrolled in the Second Kharkov Medical Institute, and after graduating in 1944 he worked as chief of several medical sections of the USSR Ministry of Internal Affairs.

After liberation of the Ukraine from the fascist invaders, Ye. M. Polyakov was sent to Chernovitsy Oblast, where he worked as chief physician at the rayon hospital, then assistant in the Department of Physiology, Chernovitsy Medical Institute, and from 1947 on as chief of the Chernovitsy Municipal Health Department. In 1949-1954, Yevgeniy Maksimovich headed the medical and sanitary service of the Southwestern, Vinnitsa, Southeastern and Dnepr Region railroads. Then, he was director of the board of the Saki Resort. From 1958 to 1965, Ye. M. Polyakov was chief of the Dnepropetrovsk Oblast Health Department. Yevgeniy Maksimovich was generous in sharing with young people his knowledge and experience as a health care organizer. Many of his disciples became prominent public health organizers, and under his supervision Dnepropetrovsk Oblast became a school of advanced knowhow in public health in our country. For his achievements, the Order of the Red Banner of Labor and Gold Medal of the USSR VDNKh [Exhibition of Achievements of the National Economy] were bestowed upon Yevgeniy Maksimovich.

In 1965, Ye. M. Polyakov organized and headed the Dnepropetrovsk Scientific Research Institute of Gastroenterology.

In March 1967, Ye. M. Polyakov was appointed director of the Odessa Scientific Research Institute of Virology and Epidemiology imeni I. I. Mechnikov. In the years that he worked at this institute, Yevgeniy Maksimovich was able to unite the staff, orient their work toward solving pressing scientific problems of influenza and render direct and effective assistance to the republic's clinical health care agencies. The Badge of Honor and Valiant Labor Medal were bestowed upon Ye. M. Polyakov for his fruitful work at the Odessa

Scientific Research Institute of Virology and Epidemiology imeni I. I. Mechnikov; the work of Ye. M. Polyakov was displayed at the USSR VDNKh.

Ye. M. Polyakov was an outstanding epidemiological specialist, public health organizer and virologist, and he authored 73 scientific works. He had diversified scientific interests: organization of work of public health institutions in the area of epidemiology and prevention of bacterial and viral infections (dysentery, tuberculosis, viral hepatitis, diseases caused by arboviruses), as well as investigation of antigenic variability of influenza virus and forecasting the influenza-related epidemic process.

Professor Ye. M. Polyakov was active in party and social work.

For many years, Yevgeniy Maksimovich headed the Odessa Affiliate of the Ukrainian Scientific Society of Microbiologists, Epidemiologists and Parasitologists imeni Academician D. K. Zabolotnyy.

A prominent scientist, public health organizer, a man of great kindness and communist, Yevgeniy Maksimovich Polyakov devoted all his talent, knowledge and experience to the service of the party, people and safeguarding the health of Soviet people.

A bright memory of Yevgeniy Maksimovich Polyakov will remain forever in the hearts of his disciples and fellow workers.

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